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'Commodification' of Knowledge: Challenges and Opportunities of a State Funded University – A University of Botswana Case Study

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ABSTRACT

This study examines the role of tertiary education in the development of a knowledge based economy, with particular reference to developing countries and in the particular case of the University of Botswana (UB). It presents evidence to suggest that the commodification of knowledge is important to the fulfilment of this role and that if UB were to embrace this notion, it would help focus the fragmented approach of business practices in the University. The study also asks whether the resource allocation model at UB supports commodification of knowledge and examines what alternative approaches could be adopted, concluding that the adoption of a formulaic resource allocation model would better support this aim.

A case study approach was adopted especially for its potential to capture explanatory and descriptive data. The three phases of study used were firstly the documentary research where reports were inspected and classified into categories. The second phase concentrated on the semi-structured interviews with members of the senior management staff at UB that served to clarify, confirm, refute and/or corroborate documentary research outcomes. The third phase of the study combined the data collected from the different sources. In combining both quantitative and qualitative data this thesis took advantage of data complementarity, facilitation and triangulation.

The findings of the study show that UB embraces the notion of knowledge based economy through advancing the intellectual and human resource capacity of the nation and the international community. However the definition of commodification was not uniformly understood across UB faculties. The study also finds that UB did not seem to have a resource allocation model but had a budgeting system that did not support commodification of knowledge. While the human resource accounted for 67% of the total budget of the institution there was no staff allocations model to manage it. The inadequate database was found to be a major contributing factor which was exacerbated by lack of clear business processes in certain critical areas. The principles underpinning commodification of knowledge could be traced in UB policies even though there was a need to strengthen systems, processes and quality control mechanisms to facilitate and support data collection and establishment of database. A practical system which has the potential to help establish a systemic approach that would interrogate business process in UB is proposed.

Glossary of Abbreviations

UB	University of Botswana
CCE	Centre for Continuing Education
KAM	Knowledge Assessment Methodology
HE	Higher Education
ITS	Integrated Tertiary Software
KBE	Knowledge Based Economy
TEC	Tertiary Education Council
NQF	National Qualification Framework
EKE	Education for the Knowledge Economy
ICT	Information and Communication Technologies
SSA	Sub-Saharan Africa
NHRD	Human Resource Development
HEFCE	Higher Education Funding Council
BIDPA	Botswana Institute of Development and Policy Analysis
SADC	Southern African Development Community
CESPAM	Centre for Specialisation in Public Administration and Management
GDP	Gross Domestic Product
CSS	Centre for Strategic Studies
BOTA	Botswana Training Authority
SADSEM	Southern African Defence and Security Management Network
DVC	Deputy Vice Chancellors
BOCODOL	Botswana College of Distance and Open Learning
NDP	National Development Plan
HIV/AIDS	Human Immune Virus/Acquired Immune Deficiency Syndrome
VET	Vocational Education and Training
RNPE	Revised National Policy on Education
DVET	Department of Vocational Education and Training
UBBS	University of Basutoland, Bechuanaland and Swaziland
BTEP	Botswana Technical Education Programme
ITRC	International Tourism Research Centre
BGCSE	Botswana General Education Certificate of Secondary Education
JC	Junior Certificate
UBLS	University of Botswana, Lesotho and Swaziland
BUCA	Botswana University Campus Appeal
UNESCO	United Nations
DRC	Democratic Republic of Congo
CESRIKI	Centre for Scientific Research, Indigenous Knowledge and Innovation
IP	Intellectual Property
NER	Net Enrolment Ratio
FTE	Full Time Equivalent
FET	Faculty of Engineering & Technology
PRC	Planning and Resource Committee

ORD	Office of Research and Development
BMC	Botswana Meat Commission
BBS	Botswana Bureau of Standards
SACMEQ	Southern Africa Consortium for Monitoring Educational Quality
USPTO	United States Patent and Trade Office

Chapter 1

1.0 The Rationale and Context of the Problem

As a developing economy, Botswana's industries continues to experience change, having moved from being a poor subsistence farming economy to developing its beef industry, mining and tourism sectors. In the education sector, tertiary education has to contribute towards sustenance of knowledge-intensive financial, business, and tourism sectors of the economy as well as the development of human capital in mining. Botswana, therefore, is at a transformation stage in many respects and needs an education system that is compatible to its needs, one that will facilitate the analytical capabilities of its people and transfer of skills especially in science and technology.

Although Botswana continues to be seen as making progress in the way it manages its resources, it continues to face challenges regarding resource allocations both at national and institutional levels. Botswana also faces the challenge of aligning its education system to address the skills required in industry. Botswana is faced with challenges of providing the necessary human capital and infrastructure amid a growing number of school leavers and individuals planning to be trained, retrained and re-skilled. With a population of 1.7 million sparsely spread across 580 000 square kilometres of land, sharing the limited education resources remains a challenge. As a developing economy, Botswana's growing demand for skilled personnel requires an equally responsive education system. As the country is shifting from a social welfare orientation towards a capitalist economy prudent resource management has become key in the transformation process.

1.1 Knowledge Economy

Botswana aspires to become a Knowledge-Based Economy (KBE) and is gearing up for challenges and opportunities that come with the phenomenon of knowledge as an economic commodity (Botswana Government 1997). A KBE can be defined as an economy whose main activity is based on the sale and exchange of knowledge, i.e. knowledge becomes its trade commodity. A KBE's exploitation of knowledge plays the predominant part in the creation of wealth (Brinkley 2006). Therefore the economy's human capital is pivotal to its successful performance. There is no doubt that tertiary education and indeed higher education become important in the development and growth of KBE because these ensure a continued flow of human capital and new knowledge. The World Bank (2002) subscribes to the notion of Education for the Knowledge Economy (EKE) as it aims at helping developing countries equip themselves with highly skilled and flexible human capital needed to compete effectively. The World Bank considers the important role of universities as the main locus of both basic and applied research and therefore it is important to maintain advanced training and research programs at the postgraduate level (World Bank, 2002). The aspiration by Botswana to become a knowledge economy makes it compelling to situate its economy within the global economy by conducting a knowledge assessment analysis. This was conducted through the Knowledge Assessment Methodology (KAM) which provides for a theoretical and conceptual framework as discussed in chapters three and four before the diagnosis output is considered. It is for this reason that the KAM diagnostic outcome is deferred to Chapter five of the study. The focus of this thesis is on tertiary education with emphasis placed on university education and its role of creating the intellectual capacity to produce and utilize knowledge. This thesis places emphasis on resource allocation models as central to financial efficiency and optimal usage of resources in fulfilling this role.

It is pertinent to address the role of the university as the main agent in the tertiary education system of a KBE and to critically assess the efficiency and the manner in which individual Higher Education (HE) institutions manage the available limited resources. It is also important to assess whether universities should be state funded or should be moving towards being state supported and therefore generating third stream revenue. In the discussion below the role and

functions of the university are placed in the context of the KBE. An attempt to understand commodification of knowledge in a university education environment is made with a view to analyse its contribution to the KBE.

1.2 Transformation of Tertiary Education in Botswana

As will be shown later, the tertiary education transformation in Botswana has come through the introduction of the tertiary education policy with the title "Towards a Knowledge Society" (Government of Botswana, 2008). The policy recognises the importance of research output and innovation as well as HE's pivotal role of knowledge and wealth creation. The comprehensive plan is based on the position of scientific and technological research as a driver of national advancement and wealth creation; business knowledge as the source of economic power; and humanities and social science research as the key to social, cultural, and personal transformation and development (TEC Report 2006). The perspective that Botswana chooses to adopt will therefore determine the direction of policy reforms. Whichever direction the policy reforms take they will certainly require human and capital investment.

Some of the reforms currently underway are worth noting. The establishment of the Tertiary Education Council (TEC) in March 1999 to take on the responsibility for the coordination of tertiary education and for the determination and maintenance of standards of teaching, examination and research in tertiary institutions of Botswana marked a new beginning in tertiary education. Apart from drafting the tertiary education policy for Botswana, TEC has since come up with a number of consultancies concerned with the Funding Model for Tertiary Education in Botswana; a study to establish a National Qualification Framework and a study to develop a National Human Resource Development Strategy for Botswana. These reports and findings are yet to be publicly shared and with them many reforms will emerge.

Borrowing from Lebeau (2008), a public university can be said to have a dual status; as an institution financed and, to varying degrees, controlled by the state it is potentially part of the ideological apparatus of the state. This links it to the reproductive apparatus of society. It is potentially one of those social institutions of civil society that may help in holding accountable the state and the business sector while potentially providing a source of debate on current

directions and visions of society's future (Lebeau, 2008). To this end it is important to discuss developments at the University of Botswana as an agent of higher education transformation.

The University of Botswana (UB) in 2004 completed its strategic plan, known as Shaping Our Future (UB, 2004), in which it set out the strategic priorities which will guide its future development to 2009 and beyond. Five priority areas were articulated, thus a) Expanding Access and Participation b) Enriching Quality Academic Programmes c) Engagement and Entrepreneurship d) Extending Research, Scholarship and Graduate Studies and e) Enhancing Capabilities including the vision , mission and aims of the UB. A number of task force groups, committees and consultancies have since been commissioned by the UB to collect data and consult stakeholders on a number of issues.

The tertiary education transformation process being pursued in Botswana has in many respects presented challenges to the academics and the UB community. The emergence of tertiary education provision by private universities and other institutions has affected the way tertiary institutions conduct their business, especially university education. The already limited government resources will have to be competed for and shared efficiently. The efficient and effective use of resources allocated to each institution will become a priority matter. The pre-requisite conditions demanded by the TEC for institutions to operate in Botswana saw a good number of institutions being closed down and standards stepped up for those that were left to operate.

A number of factors have put pressure on the UB to identify opportunities for possible partnership with the private sector and industry with a view to engaging in entrepreneurial pursuits. The UB has for 25 years enjoyed the monopoly of being the only national university in Botswana but now it faces challenges associated with diminishing government funding. The resource allocation system that has served UB for a long time has to be reviewed, especially because resources from government to the UB have been diminishing, thereby forcing the UB to review its priorities and operations as well as embark on developing ways through which it can make the best use of the resources allocated to it.

The aims, goals and objectives of the UB have been articulated in the long term plan of the institution known as Shaping Our Future (UB, 2004) and are aligned to the nation's long term plan known as Vision 2016 (Botswana Government, 1997). The establishment and registration of new universities in Botswana will change the landscape of university education provision. UB aspires to be a centre of excellence in Africa and the world; beyond this aspiration the UB has been involved in the creation of knowledge and has the capacity to undertake more, therefore expectations are high to see it take the lead in this respect. It is for this reason that we take time to reflect on resource allocation at the UB and ways through which commodification of knowledge influences it.

1.3 Commodification of Knowledge

The concept of commodification of knowledge is still relatively new and not yet clearly defined. As a working definition let us consider knowledge as a commodity because it has economic value; value in exchange as well as social value (Jacob, 2003). In many instances knowledge attracts resources to generate and/or store it, in which case if stored it may have to be patented. If knowledge is kept away from those who need it, it becomes a scarce commodity but if shared freely and is in abundance it can be considered to be free. For the purpose of understanding, it would be good to work from the premise that commodification of knowledge acknowledges that knowledge comes in different product forms but its worth essentially combines the value in exchange that it commands in the market with the cost incurred in getting it. Commodification of knowledge is therefore the ability to harness the worth of knowledge and generate wealth out of it. Therefore converting knowledge into something that can be exchanged for monetary, social, utility or strategic gains or benefit is effectively commodification of knowledge. However generation of new knowledge enhances and broadens the opportunity to generate wealth out of knowledge.

1.4 Rationale

The World Bank places tertiary education in the forefront of creating the intellectual capacity to produce and utilize knowledge. Tertiary education in many developing economies is led by universities which are in most cases government funded, hence public universities. State funded

universities (i.e. public universities) have been leaders of higher education in many developing economies and have enjoyed a significant share of the education budget. This puts the responsibility for closing the knowledge gap on public universities; hence UB as a public higher education institution is looked upon to provide leadership in this regard. The new universities entering the university education landscape add a new dimension to an already challenging situation in that they will have to compete for resources and funding from government and they will have to compete for the students. The phenomenon of knowledge commodification puts pressure on UB to use and benefit from its capability in order to generate knowledge through effective and efficient use of resources made available to it. UB has followed a public expenditure model which for many reasons should be reviewed. A number of inefficiencies in the public expenditure model have resulted in certain undesirable quality issues that affect pre-tertiary student output and excess expenditure at tertiary level, hence the reason to assess the resource allocations model at UB. UB seems to be looking forward to moving away from an incremental budget system to using a zero based budgeting system. For this reason this chapter will present findings on key areas that influence and direct resource allocation. The UB is, however, faced with the challenge of diminishing government funding. Emerging from this the central research question for this study is:

Does the resource allocation model at UB support commodification of knowledge appropriate to the development of a knowledge-based economy?

Based on the above research question this thesis further seeks to answer the following sub-questions:

1. Does the UB embrace commodification of knowledge? If so, how?
2. Is UB addressing the issues of commodification of knowledge and needs of a knowledge based economy?
3. What support is needed to address commodification of knowledge and needs of a knowledge based economy?
4. In what way does the UB resource allocation model ensure support towards commodification of knowledge?

The research objectives of this study are in four interrelated categories:

a) To consider and review relevant literature on the notion of commodification of knowledge in higher education, especially in university education, with a view to identifying its key drivers that UB has to adhere to.
b) To establish a linkage between the notions of commodification of knowledge with that of the knowledge based economy within the context of developing economies.
c) To find out the kind of support and best practices that would lead to commodification of knowledge being realised and utilised to address the needs of a knowledge based economy.
d) To establish the role of the UB resource allocation model towards supporting commodification of knowledge.

1.5 Problem of the Study

The University of Botswana is at a cross roads. It is trying to position itself in a new and changing environment, and is therefore in transition. It faces pressure from the global environment emanating from 'commodification' of knowledge.

The UB is faced with the nation's long term goals of Vision 2016 that hinge on the development of a knowledge-based economy. Therefore UB's contribution towards building this is a fundamental requirement[1]. UB faces diminishing government funding and increased accountability demands from stakeholders. It also faces skills demands from the private sector and industry. Meanwhile there is pressure from demands made by the secondary school leavers who are not able to find places in UB, and again there is pressure from those who either want to upgrade their education or seek to change their career direction.

The problem is that the knowledge and human capital generated by UB is financed by government with the intention of addressing the manpower requirements of the economy. But the lack of joint public and private sector manpower planning leaves graduates unemployed every time the government has filled its quota of human resource requirements. Therefore a mismatch

[1] The Millennium Development Goals demands, the regional demands from the African Union Second Decade of Education as well as the SADC Protocol on Education and Training demands have to be adhered to as well.

between the private sector human resource requirements and areas of specialisation of graduates leads to an increase in unemployment of its graduates. It is therefore becoming increasingly important to devise mechanisms and indicators to guide students on how to make informed choices on university programmes. Therefore, appropriate funding of university education system would generally articulate appropriately into the skills needs and requirement of KBE.

Aspiring to become a knowledge-based economy requires a wide skills base and knowledgeable population to deliver competitive services. A knowledgeable population also increases the economy's capability to adapt and use global knowledge to address local needs. The issue is whether the programmes on offer at UB necessarily address the demands of potential employers and potential students. There is need to explore whether UB policy positions, practices and resource allocation processes are efficient and effective in facilitating this aspiration.

1.6 Purpose of the Study

The purpose of this study is to investigate whether the UB resource allocation model enhances its capacity and capability to respond to the knowledge production demands and skills development needs of the economy. Furthermore the thesis assesses how the notion of 'commodification' of knowledge has been contextualised and aligned with the UB provision of education and practice. It is expected that the preparedness of the UB to educate for a knowledge economy would be demonstrated through the strengths embedded in the resource allocation model adopted by the university and its response mechanisms to a changing environment. It is important to assess and analyse how change in the resource allocation model is likely to impact on the operations and eventually the direction that university business will take. The study aims at exposing the dilemmas and opportunities posed by the transformation as well as the challenges that come with 'Commodification' of Knowledge. It will also be important to analyse ways the UB resource allocation model responds to the changes.

1.7 Significance of the Study

The study has both theoretical and practical implications. The findings of this study will add to the literature on commodification of knowledge in the context of university education in a

developing economy. Insights and lessons gathered from the UB experience may serve as guide to other institutions as well as contribute towards the formulation of policies.

The UB faculties and departments, upon reflection, may develop new mindsets and perceptions that are likely to be instrumental in their future plans and direction. Other external stakeholders stand to gain insights on their role in the phenomenon of commodification of knowledge in Botswana and its tertiary institutions.

1.8 Organisation of the study

This chapter outlines the focus of the study and sets the research questions which are also presented as objectives. It briefly sets out the rationale and context which it presents as a problem in a developing economy that aspires to become a knowledge economy, thereby diversifying from being a resourced based economy. While it acknowledges transformation at both the national economy level and university level the rationale is grounded on the World Bank position that places tertiary education in the forefront of creating the intellectual capacity to produce and utilize knowledge. It uses commodification of knowledge as the base concept upon which the discourse revolves. As a working definition knowledge is considered a commodity because it has economic value; value in exchange as well as social value (Jacob, 2003). It presents UB as a public university which has a dual status; as an institution financed and, to varying degrees, controlled by the state, it is potentially part of the ideological apparatus of the state this links it to the reproductive apparatus of society (Lebeau, 2008) however UB's role is important as a transformative agent that builds intellectual capacity.

Chapter two presents an overview of Botswana's economy and UB. It presents a brief outline with regards to the performance of the economy but most importantly to discuss the tertiary education system. It does so by presenting a literature review on the statutory and regulatory framework that constitutes the tertiary education system. It further presents issues regarding the education expenditure and enrolment patterns while providing insights about the UB and its activities.

Chapter three is a literature review with a focus on the key concepts of knowledge economy, commodification of knowledge and transformation. Brinkley (2006) addresses knowledge economy as one that generates and exploits knowledge to create wealth. The perception that knowledge as a commodity must take on the properties of a private commodity, which requires transformation of knowledge into explicit, standardized and codified forms is further explored using Jacob's (2003) views on the issue. Having considered commodification of knowledge to comprise of processes, regulatory mechanisms and systems that ensure that quality, standards and exchange value are achieved, this thesis adopted a working conceptual framework that goes along with this understanding. The World Bank Report (2002) is used to position the university as an important player in human resource development. This study also considers Santana (2006) as encapsulating the role of a modern university as underpinning its functions. This helps to guide the discourse on exploring how UB deals with the challenge. Out of the five identified priority areas, two of them are given special attention because of the direct potential impact they are likely to have on commodification. Funding and resource allocation models are addressed because they are the source of control and direction that determine the behaviour of the university education. Four allocation mechanisms are discussed and their advantages and disadvantages are briefly outlined.

Chapter four develops the conceptual and theoretical framework, leading to a research strategy and methodology and thus providing guidance to the process of investigation. In the methodology the research questions and objectives are articulated and the parameters of the study are drawn. The use of the Knowledge Assessment Methodology (KAM) as a diagnostic tool and how the results will be used is discussed. A framework on how evidence will be gathered and analysed covers both primary (interviews) and secondary (documentary) data.

Chapter five presents the results of the KAM diagnosis and data from other sources is analysed. The scorecards results are analysed and compared to other countries in the region. This is followed by the secondary data collected with regards to the UB operation as reflected in the different sources. It is thus an in-depth presentation of policy positions and institutional data resources. Evidence drawn out of these is systematically presented to cover a) teaching, in which enrolments and spread of students across faculties is revealed; b) human resources, in which the

focus is on academics in post, spread and staff/student ratio, and c) funding, where the focus is on the budgeting and resource allocation in UB, including the revenue/cost relationship. This chapter also underscores the key areas of the university activities.

Chapter six presents the primary data which are the responses from the interviews with respondents in the study. The focus of the interviews was on UB data sources with the view to establish the nature of management information available to facilitate decision making; their position with regards to the priority area of Increasing Access and Participation, because this is the area that puts pressure on the resource distribution and allocation; their position on the priority area of Engagement and Entrepreneurship, because this is the area with the potential to raise revenue for the institution through sale of knowledge products and hence has a high potential to drive commodification of knowledge. The chapter also presents the responses on issues regarding funding and resource allocation drivers and the budgeting system at UB and carries with it programmes, research and commodification of knowledge implications.

Chapter seven presents the primary and secondary data analysis done at national and institutional level using categories covered under: institutional statistical data resources, programmes, funding and resource allocation and systems flows.

Chapter eight presents summary findings, conclusion and recommendations. It pools together responses to the research objectives in a general and broad way. This chapter gives an overview of concepts and notions underpinning the focus of the study. The two priority areas are also discussed in light of the analysis results including the institutional data resources, Integrated Tertiary Software (ITS), programmes and research. Suggestions on the role of UB are made along the lines of programmes and courses, resource allocation and research. By using analysis in chapter seven to respond to the research question conclusions are reached and recommendations made. The chapter also considers the limitations of the study and other future studies that could be conducted.

1.9 Conclusion/summary

The establishment of new universities in Botswana will change the landscape of university education provision. While increasing access and widening participation in university education is a priority area for the University of Botswana, it also presents a challenge, especially because the financial support (in real terms) from government is being reduced and stands to be further competed away by the new up-coming universities and other institutions of higher learning. Moreover the government sponsored students will be competed for by more institutions and for institutions supported by government the resources will have to be shared efficiently. It is important to assess and analyse how this will change and what steps UB is taking to retain its leadership in university education provision. Botswana's aspiration to become a Knowledge-Based Economy makes UB's contribution towards building the necessary knowledge base more pronounced and compelling especially when we consider its role towards creating intellectual capacity. The following chapter will discuss the background of Botswana's economy and provide an overview on education in Botswana in general.

Chapter 2

2.0 The UB and Education in Botswana

This chapter takes a brief look at UB's performance and places it within the context of the Botswana's ongoing tertiary education transformation. This chapter will present an overview of what UB is doing and planning to undertake to strategically position itself to benefit in the transformation process. This chapter presents a background to some of the significant work and contributions that UB has made within the region as well as how it plans to move on in line with the nation's aspirations. This chapter therefore presents the background to Botswana's state of higher education in general.

2.1 Background

2.1.1 The economy

Botswana's economy has developed from being the least developed state to a medium income economy. The mining industry developed rapidly and income generated through it was channelled to develop the social welfare status of Botswana people. The efforts to diversify the economy have had little success but Botswana's economic growth strategy has since taken the economy from a social welfare[2] orientation towards a capitalist economy[3]. The education system that spearheaded and supported these developments would seem to have been slow to respond to changes that accompanied economic developments. The Millennium Development Goals (UNDP: 2000) adopted during the UN Millennium Summit of September 2000, the SADC protocol on education and training (SADC: 1997) and the African Union Second Decade of Education (African Union: 2006) are key documents that set milestones against which to measure progress in education.

The Botswana Statistical Year Book (Botswana Government, 2004) shows that Botswana had a population of approximately 1.7m with an average annual population growth rate of 2.39%

[2] The development of the primary health care services, literacy and free basic education, access roads into previously inaccessible places are evidence of deliberate social welfare policies.
[3] Emphasis on entrepreneurship, financial assistance policy (FAP), small, micro and medium entrepreneurship (SMME) Business financial assistance policy, citizen empowerment and development Agency (CEDA) schemes, invitation for foreign direct investment (FDI) and joint ventures initiative including privatization of parastatals are capitalist tendencies.

during the 1991-2001 census[4]. Compared to the average of 3.5% during the 1981-1991 census there is a 1.1% decrease in the population growth rate. The urban areas had a 4.15 annual percentage growth compared to 0.67% in rural areas. The average total fertility rate during the period 2000-2005 at 3.9 is smaller than that of the region at 5.6[5]. The fertility rate has dropped from 5.2 in 1991 to 3.2 in 2001 and life expectancy has dropped from 65.3 in 1991 to 56.7 in 2001. The infant mortality and life expectancy are also lower than those of the rest of Sub-Saharan Africa (SSA). The 2001 census shows a decline in the concentration of the 0-29 age group at 67.6% compared to 71% in 1991. The demographic changes are partly associated with effective family planning and partly with the impact of HIV/AIDS.

The structure of the economy showed the agricultural sector accounting for 2.5% of the Gross Domestic Product (GDP) and industry accounting for 52.3% of GDP out of which 4.1% is from the manufacturing sector. Mining now accounts for about 35% of GDP, and 45.3% goes to the services sector (2003/04 constant 1993/94 prices). The average annual growth rate of agriculture over the 10 year period of 1995 to 2005 dropped by -0.2% although 2004 it recorded a 3.1% growth and 3.8% in 2005[6]. Overall, the agricultural sector has not done well in the 1994-2004 period. Botswana's economic indicators continue to show progress despite the challenges it faces. The GDP per capita has continued to improve from P 8 073 (1996) to P9 784 (2002) thus an average annual growth rate of 3.1%.

The GDP increased from 17,740 million Pula in (1996) to 36, 337 million Pula in (2003)[7] thereby recording an average of 14.5% annual percentage change; however, GDP dropped to 18, 796 million Pula in 2004. The emerging GDP structure, which is now skewed in favour of the growing knowledge-intensive service sectors, has implications for the role and contribution of education to the economic development of Botswana. The knowledge-intensive financial, business, and tourism sectors which contribute nearly a quarter of the GDP have pressured the tertiary education sector to re-think ways through which it can be sustained and remain relevant to the economy.

The National Development Plans, usually designed to cover a five year period, have remained the most important control instrument in the implementation of the different sector activities. The

[4] **http://earthtrends.wri.org** Population, Health and human well-Being (accessed on 25th April 2007)
[5] **http://earthtrends.wri.org** Population, Health and human well-Being (accessed on 25th April 2007)
[6] The World Bank Group: World Bank published data. 8/12/06
[7] Using GDP by type of expenditure at current prices CSO, 2004 Page 40

annual budget allocations distribute funds to the different departments of government and closely follow the NDP for development budgets. The expenditure pattern is based on the plans as well as the available funds. The expenditure on education has seen an average increase of 11% of the GDP (Botswana Statistical Year Book (2004).

As a result of the investment into human capital the Botswana's human development index improved, only to plunge when the HIV/AIDS scourge slowly siphoned off the lives of the small population of Botswana. The expenses of the health sector escalated at alarming proportions and government was forced to abandon some developmental projects to tend to the pandemic. The HIV/AIDS pandemic forced budgets to be adjusted in order to accommodate challenges that came with it. The education sector was not spared as it was also faced by the same problems.

2.1.2 Education in General

The free-for-all policy of Botswana's primary education has resulted in increased demand for the junior secondary schools which increased by 5.5% from 1996 to 2003, although senior secondary schools have remained at 23 schools across the country since 1996. Therefore the pressure to provide additional places has forced government to introduce alternative measures including double shift schooling at senior secondary education. The introduction of double shift schooling has had its impact and there are lessons yet to be learnt. The pressure to increase senior secondary schools has compelled additional construction of more schools to be undertaken.

The Net Enrolment Ratio (NER) for the 6-12 years age group decreased from 89% in 2002 to 86% in 2003 a drop indicating that fewer pupils of the appropriate age have enrolled during that period. It also implies that 14% of the children in the appropriate age group of enrolling into standard 1 are still at home. The enrolment at all levels during 1993-2004 shows an average annual percentage increase of 2.0% on pre-tertiary education and an average annual increase of 8.3% on tertiary education. The average annual percentage increase in tertiary education is higher compared to that of the pre-tertiary average annual increase. The pre-tertiary enrolments (in absolute terms) exceed tertiary education enrolment as shown on (Table 1).

Table 1: Enrolment at all educational levels (1993-2004)

Educational Level	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Average % Increase (1994-2003)
PRE-TERTIARY Primary	305 479	310 128	313 693	318 629	322 268	322 690	322 475	324 283	329 451	330 835	330 376	328 692	
Secondary	85 687	86 684	103 159	108 373	116 076	143 503	148 195	152 246	151 847	155 207	156 786	158 839	
Total Pre-tertiary	**391 166**	**396 812**	**416 852**	**427 002**	**438 344**	**466 193**	**470 670**	**476 529**	**481 298**	**486 042**	**487 162**	**487 531**	
Increase (%)	-	1.4	4.8	2.4	2.6	6.0	1.0	1.2	1.0	1.0	0.2	0.1	**2.0**
TERTIARY LEVEL Teacher Education	2 660	2 363	2 441	2 417	2 260	2 313	2 396	2 507	2 899	3 155	3 328	3 049	
Vocational Tech Ed	4 675	5 481	8 095	6 208	8 830	9 939	9 609	10 896	11 507	10 882	11 133	12 649	
Agriculture College	331	332	376	321	392	392	392	604	801	777	1 178	854	
University	4 466	5 056	5 501	7 297	8 007	8 598	9 595	11 722	12 286	13 221	15 628	15 724	
Total Tertiary	**12 132**	**13 232**	**16 413**	**16 243**	**19 489**	**21 242**	**21 992**	**25 729**	**27 493**	**28 035**	**31 267**	**32 276**	
Annual Increase (%)	-	8.3	19.4	-1.0	16.7	8.3	3.4	14.5	6.4	1.9	10.3	3.1	**8.3**

Source: Central Statistics Office **csobots@gov.bw Created: 28 August 2006 (April 2007)** Education Statistics (2003)

It would appear only a small percentage of the pre-tertiary education population continues into tertiary education, therefore it is important to discuss progression rates to tertiary education. There is a transition rate problem which needs to be looked at. The progression rates from the primary up to the senior secondary level show that the proportion of pupils who started standard 1 (1993) and reach standard 5 is 89%. Thereafter 83 % reached standard 7 and 42% made it to form 5 Botswana General Education Certificate of Secondary Education (BGCSE) which is a school leaving certificate and an entry requirement into tertiary education. Part of this population is eligible for tertiary education and evidently most students remain behind at form 3 Junior Certificate (JC). There is an indication that more successful primary school leavers find places in junior secondary schools this implies that there is an increased output from junior secondary to senior secondary schools which in turn would put pressure on tertiary education institutions. The growth in the secondary education enrolments however shows a gradual increase in both sexes and the figures have remained relatively stable with slight upward adjustments annually. The gender disparity in different education levels indicates either an equal or higher percentage in favour of female students at pre-tertiary levels but favours male students at tertiary education.

There are two major issues to be considered; firstly there is need for progression rates to be improved, which is about quality enhancement at junior secondary education; secondly there is

an indication that tertiary education institutions are unable to cope with the pre-tertiary output and therefore requiring attention. To this end the UB is faced with the challenge to provide opportunities for the school leaving students.

2.1.3 Tertiary Education

The changes that have come with reforming tertiary education are putting pressure on the UB to change its ways and practices. The establishment of the Tertiary Education Council by a statutory act of parliament (TEC Act 1999); the introduction of the National Policy on Vocational Education and Training (VET) of 1997, and the Vocational Training Act No 22 of 1998; and the establishment of Botswana Training Authority (BOTA) are some of the ways Botswana is putting in to action recommendations of the Revised National Policy on Education (RNPE) of 1994 which focused on all levels of education, thus demanding improvements in primary and secondary education, vocational and technical education as well as university education. The rekindling of the Botswana Examinations Council and Botswana College of Distance and Open Learning (BOCODOL) are two examples of the efforts by government to improve the quality of education as well as increase access to education (Botshelo; 2007).

The nation's long term plan, known as Vision 2016 (Botswana Government 1997), has set milestones to be realised in education by the year 2016. Vision 2016 is delivered through five year long National Development Plans (NDP); currently Botswana is on NDP 9 and moving onto NDP 10. The government's commitment to education was openly declare when it stated that Botswana plans to build an innovative economy through universal access to basic education, increased senior secondary education, expanded vocational and technical training and promotion of lifelong training, increased tertiary education participation and attainments rates, improved access to children and youth with special needs and improved quality of education across the country. Part of putting this plan into action has been through the review of the education act of 1967 (Botswana Government, 2006).

Teacher training is one of the first tertiary training activities that was pursued by the Botswana government with the intention to address shortages in primary school education. Meanwhile under the leadership of the Department of Vocational Education and Training (DVET) the main technical colleges have seen changes in the curriculum development into Botswana Technical

Education Programme (BTEP) standards aligning the education system to international standards and expansion and lately five colleges are being built and upgraded. The government is planning to take over Brigades training institutions with a view to converting them into technical colleges (Mogae, 2006). While there are many developments in the tertiary education sector, our focus will remain mainly on higher education offered by the University of Botswana.

2.2 The University of Botswana

In 1962 an agreement between the high commission territories and the Oblate of Mary Immaculate of Pius XII Catholic University, Roma, Lesotho was reached. The University of Basutoland, Bechuanaland and Swaziland (UBBS) was opened in 1964. In 1970 the second Alexander Report was accepted by the governments of Botswana Lesotho and Swaziland and a multi campus institution known as the University of Botswana, Lesotho and Swaziland (UBLS) had campuses in the three countries[8]. In 1982 the University of Botswana came into being through an act of parliament, marking the end of partnership with Lesotho and Swaziland. With funds raised from a nation-wide campaign known as the Botswana University Campus Appeal (BUCA) the infrastructure and improvements of the campus in Gaborone were begun.

The UB has since grown, increased its enrolments to about 15 000 and expanded its infrastructure. The university's budget, both recurrent and developmental budgets are funded by government. The UB has received assistance and contributions from different partners abroad but it has remained mainly funded by Botswana government. Through the National Development Plans (NDP) the UB has grown and benefited from a comparatively generous government funding system. In turn UB has contributed towards the manpower development and has continued to be a major player in the development of human capital to the nation. Although the UB has coexisted with other institutions that are affiliated to it, such as the institutes of health sciences, and other health training institutions, colleges of education and a college of agriculture, it has for 25 years enjoyed the monopoly of being the only public university in Botswana. It therefore provides leadership to a significant number of higher education institutions.

[8]Funds from the United States, British, Canadian, Danish and Netherlands governments together with government funds from the three countries, Anglo American corporation and other bodies financed the Gaborone (Botswana) and Kwaluseni (Swaziland) campuses. University of Botswana 2002/3 calendar (www.ub.bw)

UB has developed a strategic plan (University of Botswana, 2004) in which it states its vision as being to become a centre of excellence for the region, Africa and the world; its mission statement of advancing the intellectual and human resource capacity of the nation and the international community places it as a leading university in the country. Its goals have also been defined to align with the broader overall aim. In order to assess the potential capabilities of the UB it would be best to start by looking at the UB profile, trends and key performance indicators and ultimately assess evidence of support provided by the resource allocation system of UB.

2.2.1 University Research

The University of Botswana's commitment to play its part in increasing Africa's knowledge production and to generate relevant and useful research output continues to be expressed by its leadership. UB's profile on research has been reflected in the research annual report of 2005 which also shows the UB's determination to prepare for the envisaged change in Botswana's research landscape. UB's research funding has remained at 2% of the annual budget which is significant in absolute figures but not enough for a university that seeks to serve a knowledge based economy[9]. For this reason UB has sourced external funding from donors and has partnered in a number of research projects. As a result the office of Research and Development has from 2001-2004 seen a number of policies approved to facilitate operational structures of research. These are the Research and Development Policy (2002); the Intellectual Property Policy; the Ethics Policy and the Policy on Centres of Study, all approved in 2004.

Several centres of study have since been established in UB. The Okavango Research Centre initiates, coordinates and promotes research and assists with environmental monitoring and aims to develop and implement educational strategies for the sustainable use of resources in order to promote the long-term conservation of the Okavango and other regional wetlands.

The International Tourism Research Centre (ITRC) established at the University of Botswana (UB) in 2006 is a research centre focusing on tourism as a sustainable development factor in Africa. As a joint initiative from the University of Botswana, the French Embassy in Botswana, the French Institute of South Africa, and the Institute of Research for Development, it aims at

[9] At national level the Ministry of Communication, Science and Technology has drawn up the Botswana National Research Science and Technology Plan that will lead to a creation of a funding body for research.

promoting international research collaborations in the form of research programmes, events, publications and support training of postgraduate and junior researchers.

The HIV/AIDS study centre's mission is to promote health and quality of life through research, teaching and service related to HIV and AIDS and related diseases in Botswana. It has set 6 strategic goals aimed at realising the mission. Other centres at the UB include the Centre for Scientific Research, Indigenous Knowledge and Innovation (CESRIKI); The Centre for Culture and Peace; Centre for Strategic Studies (CSS) and Centre for Specialisation in Public Administration and Management. The UB's department of Public Administration and Political Studies is home for a SADC Centre for Specialisation in Public Administration and Management (CESPAM) in the Faculty of Social Sciences and is responsible for capacity building in public administration and management.

The Centre for Strategic Studies (CSS) is part of a regional network known as the Southern African Defence and Security Management Network (SADSEM). Its mandate is to improve on security sector governance, and to facilitate security sector reform and the civil and military relations. It targets senior government officers in the security sector especially those responsible for making defence policy. As part of the regional network UB's CSS has networked with other universities comprising of the University of Witwatersrand; Centre for Foreign Relations in Dar-a-Salam Tanzania; Department of Political and Administrative studies University of Namibia; Centre for Defence studies in Zimbabwe. Other countries involved are Defence and Security Management Project Centre for African Studies, Eduardo Mondlane University, Maputo, Mozambique, the Defence and Security Management Project UNESCO Chair, University of Kinshasa DRC, Defence and Security Management, Department of History, Zambia and Centre for Strategic Studies Mzuzu University, Malawi. Other countries such as Mauritius, Lesotho, Swaziland, and Seychelles have been invited to come as observers due to limited resources. The CSS efforts have seen the infusion of new courses in the undergraduate course, namely the civil and military relations course as well as a course on security studies. An MA programme in culture, peace and security studies has been developed and is waiting to be funded and run.

2.4 Public Expenditure on Education and Training as a Percentage of GDP

Over recent years, Botswana has been spending on average about 8.5% of its GDP on education as shown on Table 2.

Table 2: Education Expenditure as a Percentage of GDP at Current Prices

Year	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03	2003/04	Average
Total GDP (current Prices)	20162.6	21523.7	24943.1	28636.5	31922.4	36337.5	18796.6	26046.1
Education Expenditure	1787.77	2275.4	2457.83	2865.6	3406.88	3548.81	3931.76	2896.3
Education as % of GDP	8.9	8.8	8.7	8.4	9.0	9.2	6.5	8.5

Source: Central Statistics Office **csobots@gov.bw Created: 28 August 2006 (April 2007)** Education Statistics (2003)

Education expenditure was highest in the years 2001-02 and has remained above 25% of the public expenditure. It can therefore be argued that government has spent generously on education. The tertiary education share remained below 10% of the total education expenditure from 1997 to 2003 but increased from 8.7% in 2003 to 14.3% in 2005. The issue is whether the expenditure is efficiently used.

2.5 The challenge

It would appear that the education opportunities are availed to both males and females; however there is a significant difference in the kind or type of tertiary education that people get to choose. More female than male students enrol in teacher education colleges and a lower percentage registers in agricultural and vocational and technical colleges. Since the year 2000 university education has seen an increase in the percentage growth of female students from 48.9% to 52% of the student population.

The current expanded UB enrolments have increased workloads for the human resource and facilities are over stretched. It is certain that UB does not have the capacity to absorb all the output of secondary school leavers due to infrastructural and human resource limitations. Furthermore not all students possess the entry requirements of programmes at UB. There is also evidence that given a choice, students would turn down programmes from UB as happened in the academic year 2007/08, when more than 900 students did not take up the UB programmes

offered. UB is still to carry out investigations in order to determine the reasons for this phenomenon.

With a second university jointly and partly supported by government in partnership with Harvard University, the UB is facing stiff competition for funding and resources from the government. The pressure from qualifying school leaving potential candidates and the change in their taste in degree programmes has attracted private universities to offer tertiary education and the government sponsored students have made it worthwhile. The emergence of the private universities and the demand for marketable undergraduate programmes is increasing, forcing the UB to re-strategise so as to stand up to the challenge. It is important for the government of Botswana to address the provision of higher education in Botswana particularly if it is to realise its aspiration of being a knowledge economy. This thesis however provides an opportunity to have an overview of university education provision including the environment and efforts being made to reform it.

2.6 Conclusion/Summary

The chapter has taken a brief look at Botswana's economic and legislative situation as well as the education expenditure and resource distribution pattern. The transition rates, progression rate and gender participation have been noted as some of the compelling circumstances under which government funding and budgeting is conducted in tertiary education public institutions. In aspiring to become a knowledge based economy Botswana has opened its doors to global competition in knowledge generation and transfer. The issue is therefore to seek ways that justify university expenditure on accessing and widening participation without compromising quality and investments in "commodified" knowledge. Since Botswana intends to be a knowledge economy it requires dynamic and relevant knowledge endowed tertiary education colleges and universities as well as systems to support its human resource development.

Botswana's free primary/secondary education for all policy has improved the primary education enrolments and has provided many Batswana with an opportunity to get basic education resulting in high enrolments in secondary schools and increased demand for tertiary education. The demand for education beyond the secondary level in most countries puts pressure on

governments to provide public resources that are adequate to meet the demand. Therefore there is need to be mindful of these matters as we explore the possible routes that UB may undertake. Before addressing the operations of UB it is important to understand the background and education developments that put into context the challenges that the tertiary education system is faced with. Chapter three will present theoretical perspectives and concepts as well as review literature that forms the basis of the study. It will set out to address transformation, knowledge economy, commodification of knowledge as well as draw a conceptual framework on funding and resource allocation models.

Chapter 3

3.0 Literature Review

The transformation of resource based economies into knowledge economies has prompted renewed attention to research and education which are key to the realisation of the knowledge economy. The pressure to promote commodification of knowledge produced by faculty, research and students has prompted scholars to rethink the roles of university, as well as rethink the concept of learning.

This chapter discusses the theoretical perspectives and some of the perceptions held about university education especially with regards to the implications of the "commodification of knowledge". It therefore seeks to underscore the importance of resource allocation in universities that exist in economies that aspire to be knowledge economies. In keeping with this view we explore ways through which the production of knowledge is resourced and commercialised, and the dynamics of payoffs and benefits accruing to knowledge generation, as seen from a state funded university perspective. The UB's priority on engagement and entrepreneurship is indicative of its endeavour to become innovative and to promote entrepreneurship, thereby making "commodification' of knowledge possible.

The University of Botswana has prioritised increasing access and widening participation to university education. This has been placed within the context of Botswana as an economy that is making efforts to become a knowledge based economy. It also makes the UB's contribution towards building the necessary knowledge base more pronounced and compelling. This chapter also discusses the literature that supports and provides reasons for the need to promote increased access and widening participation within the context of a knowledge economy; its impact on the university's internal structure and management system as well as the external influences it exerts on the labour market. The key terms in this study are: knowledge economy, commodification of knowledge and transformation. These concepts and their clarification in the literature will therefore form the focus of this chapter.

3.1 Knowledge Economy

Those who attempt to define the concept of knowledge economy have described it in different ways. In many instances the definition that seems to come through is a description of the knowledge economy and its characteristics. Brinkley (2006) considers 'knowledge economy' and picks on the following contribution from the DTI Competitiveness White Paper (1998) that a knowledge economy is one

> in which the generation and exploitation of knowledge has come to play the predominant part in the creation of wealth…. it is also about the most effective use and exploitation of all types of knowledge in all manner of economic activity.

The additional aspect of a knowledge economy that is important to consider is that of having the capacity and ability to create, store[10], share and utilise knowledge to gain competitive advantage. Chen and Dhalman (2005) find that the

> …. new world economy depends on developing successful strategies that involve the sustained use and creation of knowledge at the core of the development process. At lower levels of development, which typically implies lower levels of science and technology capability, knowledge strategies typically involve the tapping of existing global knowledge and adoption of such foreign technologies to local conditions in order to enhance domestic productivity.

Developing economies are generally at the lower levels of science and technology capability therefore the challenge to those aspiring to become knowledge economies is on their capacity and ability to create new knowledge, especially in the field of science and technology knowledge.

Because science and technology knowledge is costly to generate it is mostly imported by developing countries from developed economies[11]. For developing countries that aspire to

[10] The storage of codified or rule based knowledge can also be achieved but knowledge acquired on the job and residing in individuals heads as know how and skills can be difficult to control.

[11] Commodification of knowledge would generally lead to private knowledge products such as text books, electronic journals, teaching and learning platforms such as WebCt, blackboard and research analysis software packages such as Statistical Package for Social Sciences (SPSS) all of which require an annual licence fee to be paid. It includes inventions and copyrighted and

become knowledge economies adaptation and utilisation of existing knowledge is feasible and achievable but to a limited extent. New knowledge is generally scarce because it is almost always patented, copy righted or it becomes a matter of intellectual property rights protection thereby kept away from those who cannot afford to pay for it. This makes developing countries lag behind and therefore be less competitive unless they can create their own new knowledge. Commodification of knowledge therefore becomes an issue if you cannot create and own new knowledge.

The issue to consider at this stage is one of what kind of knowledge generation is expected from a state-funded university. What investment and cost implications can we make out of knowledge generation? We cannot immediately provide an answer to these questions; suffice it to say state funded universities have both social responsibility and have to deliver on the mandate from stakeholders (government) within given budgets. They are also encouraged to be innovative and entrepreneurial as well as contributing to the skills base of the economy. It is through balancing the budget and their responsibility through resource allocation models that the university may be able to deliver appropriate products.

3.2 Production of Knowledge

Jarvis (2001) argues that in the western world the pressures on the universities exerted by the changes in the contemporary knowledge based society are causing strain in the traditional institutions of higher education of the western world. This situation is however not confined to the western world but also affects the developing economies. It is further argued that change brings opportunities and more cautious reactions to forces of change (Jarvis, 2001). Notably the changes are in the new status of the university, forms of knowledge, nature of research, methods of programme delivery, as well as the role of the academic and student clientele (Jarvis, 2001).

Gibbons (1998) acknowledges that

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patented creations. It should be noted however that there exists open source packages that can be accessed for no fee these come as utility products which for institutions that want to lead in knowledge products tend to be considered one step behind cutting edge research (Botshelo, 2008: p2).

> The main change, as far as universities are concerned, is that knowledge production and dissemination -- research and teaching -- are no longer self contained activities, carried out in relative institutional isolation. They now involve interaction with a variety of other knowledge producers. In this situation, connections will increasingly involve the use of the potentialities of the new information and communication technologies.

The major change in the emergence of a distributed knowledge production system and knowledge is characterised by a set of Mode 2 attributes. Mode 2 knowledge is transdisciplinary; it is produced in a context of application; it is more socially accountable and reflexive; it includes a wider, more temporary and heterogeneous set of practitioners, collaborating on a problem defined in a specific and localised context. Whereas compared to Mode 1 where knowledge production is disciplinary based; characterised by relative homogeneity of skills and organisational diversity; and its problems are set and solved in a context governed by the (largely academic) interests of a specific community as well as enhanced social accountability (Gibbons 1998).

The involvement of other knowledge producers brings in competition that manifests itself in pressure to deliver quality outputs at efficient costs and pressure to continually innovate. Therefore creativity becomes instrumental in driving the competitive edge. However where value-added is not happening through creation of new knowledge then resourcefulness lies in the creativity to configure knowledge resources. Gibbons (1998) argues that "when the emphasis thus shifts from the creation of knowledge to its configuration, new types of productive workers must emerge to drive the process". Higher education is expected to contribute to the strengthening of international competition and the enhancement of the quality of life by being able to interact more closely with other knowledge producers. So, through configuring resources around different problems repeatedly, depending on the nature and context of the problem, judgments about the knowledge and skills that are most important will lead to strategic choices and partners.

Notably Gibbons (1998) recognises the importance of the key mental shift embodied in the distinction between Mode 1 and Mode 2 knowledge production. One has to grasp that the understanding of complex systems requires the use of shared resources. These resources are now distributed both nationally and, increasingly, globally and no one country can expect to have all

the human, technological and financial resources that are needed to reach an appropriate understanding of complex systems. In order to operate efficiently, universities will need to be much reduced in size, and they will have to learn to make use of intellectual resources that they do not fully control Gibbons (1998). It is for this reason that the study looks closely at the efficiency of the operation of the UB with emphasis on resource management systems.

It is important to consider critical strategies of addressing commodification of knowledge by first dealing with those issues that institutions have control over. Cost control and effective use of available resources are factors that can be managed by the institution. State funded universities in developing countries are small and do not have substantial resources to individually influence the global environment. They however can work on their strengths to develop a competitive edge by efficiently taking advantage of different forms of help extended to them.

The World Bank is committed to support education for the knowledge economy in developing economies and more importantly, such economies need to demonstrate efficient use of resources. It has a knowledge assessment methodology supported by a database that shows the performance of many countries. Developing countries that compete for international support need to have efficient systems that adhere to international standards and therefore qualify to receive support or must be willing to change. The attributes of mode 2 knowledge production proposes transdisciplinary collaboration with a wider heterogeneous set of practitioners and the use of intellectual resources that universities do not fully control. Universities need to show that they are competently controlling their own resources before they can take on a globally controlled environment.

An institution that takes on corporate value systems tends to adapt practices that seek to maximize benefits and improve its financial welfare standing through minimising costs and increasing its revenue generation capability. Effectively strategic allocation of university human resource and taking advantage of the e-learning or online learning is important as it would lead to increased capability of an institution because staff may be released from their teaching loads and have more time to focus on research that has the potential to generate additional revenue for the institute and as well as transferring new knowledge. This is critical especially in state funded institutions that compete for the diminishing international and governmental funding. It is for this

reason that the study has focused on the efficient utilisation of resources especially through resource allocation processes. It uses commodification of knowledge to structure and organise this discourse.

3.3 Commodification of Knowledge

In discussing commodification of knowledge the thesis refrain from pursuing arguments by various scholars on the pros and cons of commodification but opt to group and accept certain definitions that describe commodification as guiding and giving impetus to the discussion. Shumar (1997) defined commodification with reference to education and in particular to higher education as a theoretical notion that provides for a way of modelling certain changes that have taken place in social life. Central to this issue is the fact that commodification focuses on circulation and exchange for value not for substance and therefore emphasising one's ability to convert it into capital Shumar (1997). It is observed that in this instance "commodification is a model to discuss the process by which the economic overtakes other institutions and aspects of social life" Shumar (1997) therefore commodification is considered to be a significant aspect of capitalism.

Shumar (1997) warns of the crisis and instability of capitalism as a social and economic system which manifest in shaping students and the kinds of knowledge schools produce and disseminate. Therefore care has to be taken in embracing the notion of commodification in higher education because it involves the transformation of social activity of education to needs of a capitalist economy, production of a workforce, new products and new markets and the use of state apparatus to manage people in the society and the overall system.

Notwithstanding the contribution by Shumar (1997) universities have been in the business of knowledge generation. They are now being encouraged to venture into innovation in collaboration with industry in an endeavour to create wealth and to promote entrepreneurship. Jacob (2003) identifies two kinds of entrepreneurship and writes:

> Entrepreneurship 1, in the context of higher education and research, is connected with the notion of self-sufficiency or independence. Financial self-sufficiency in this reading is

> seen as the only guarantor of future academic autonomy and commodification of university knowledge as a means to this end. Entrepreneurship 2 is a reading which places entrepreneurship in the context of a broader movement to integrate science with society. Entrepreneurship in this frame is portrayed as the missing link between production of knowledge and the ability to derive economic benefit.

The argument advanced is that in order to justify continued access to public funding, the research community must agree to surrender some of its autonomy and devote its resources to creating value for society in the first instance and value for science in the second. It is therefore a break with the past rationale, in which science created utility for society by focusing on the development of its own internal agendas (Jacob 2003). Both entrepreneurship types involve the commodification of knowledge and the legitimatisation of non-scientific goals as part of the scientific research agendas.

We consider commodification of knowledge as giving impetus to economic activity hence to the knowledge economy. This raises the question whether knowledge is an economic commodity such that it commands value in exchange. The notion of the commodification of knowledge is seen as the practice of creating wealth through exchanging knowledge which implies economic value and value in exchange. It therefore associates commodification of knowledge with economic activity. This therefore gives rise to the consideration of knowledge as a social commodity, where knowledge is exchanged as a social commodity and commands social value and utility does not make it less important. Because universities have been involved in knowledge generation and in the building of intellectual capacity they inevitably become key players in the commodification of knowledge.

Commodification of knowledge may be understood to mean transforming knowledge into a commodity ready for use or consumption. The perception that knowledge as a commodity must take on the properties of a private commodity requires transformation of knowledge into explicit, standardized and codified knowledge. Let us consider the commodification of knowledge to be comprised of processes, regulatory mechanisms and systems that ensure that quality, standards and exchange value are achieved by Higher Education (HE).

3.3.1 Universities as agents of generation of knowledge and commodification of knowledge

It is acknowledged that whatever the specific path a country chooses to close the knowledge gap between itself and industrial countries, improvements in the level and quality of human resources are a necessary requirement (World Bank, 2002). Therefore the activities of HE public institutions that have the responsibility to close the knowledge gap become central to this discussion. The Africa Regional Training Conference on Tertiary Education, Accra, Ghana, Bollag (2004) noted that while universities may be weak in many Sub-Saharan African (SSA) countries, they are often the only national institutions with the skills, equipment and mandate to generate new knowledge, and to adapt knowledge developed elsewhere to the local context. The World Bank considers the important role of universities to be the main locus of both basic and applied research and therefore it is important to maintain advanced training and research programmes[12] at the postgraduate level (World Bank, 2002). It is these perspectives that make universities in Africa key players in the development of knowledge.

In the current set up, universities are skilled, equipped and mandated to undertake the task of knowledge generation and some governments have funded universities in this respect. Although African universities are mainly teaching institutions the tertiary education reforms present them with the opportunity to prove themselves as viable agents of change in intellectual and human resource development.

The World Bank report (2002) shows that factors that can assist countries aspiring to close the gap separating them from scientifically advanced countries include:

a) the process of innovation;
b) policies and practices that make investments in human resource development more effective;
c) open cross-border collaboration and freely shared basic knowledge;
d) development of effective policies and institutions in science and technology and,

[12] The perception is that programmes are intermediate products that help produce graduate output into the market. For these programmes to attract students they should appeal to the student by demonstrating and signalling to the student the marketability of skills they will acquire if they chose to purchase the products.

e) producing well-trained people in the related sectors.

The World Bank subscribes to the notion of Education for the Knowledge Economy (EKE) because it aims at helping developing countries equip themselves with the highly skilled and flexible human capital needed to compete effectively. The key areas that the World Bank would support for EKE include efforts comprising of secondary and tertiary education; lifelong learning; science, technology and innovation; and Information and Communication Technologies (ICT)[13]. However, rethinking the role of the state as sole provider as well as enabler and quality assurer of education is an issue that requires attention. To this end identifying options for sustainable financing, strengthening labour market linkages, and addressing the political economy of reforms are amongst the most important. Our focus however, will be on tertiary education with emphasis placed on university education and its role of creating the intellectual capacity to produce and utilize knowledge.

Santana (2006) makes key observations about the role of the university, notably, that universities play a decisive role in educating people, developing theories, acting as partners in technological R&D, functioning as knowledge repositories and promoting knowledge sharing. While there are strong economic reasons for science-industry links to be developed and nurtured it would seem universities have tended to support the business enterprise sector as an alternative way to patch cutbacks in governmental funding. To this end the University has to learn to adapt to new research, teaching and learning demands so as to continually track the processes of knowledge creation in the context of application. This implies changes of mission and culture, strategy, structure, curricula offered and media use, resource allocation, and external relationships. The aim is to develop a university which generates new knowledge and quickly decides when and how to make it commercially available or alternatively to prevent it from commodification (Santana 2006).

[13] Secondary education to lay the foundation of a healthy, skilled, and agile labour force; Tertiary education to create the intellectual capacity to produce and utilize knowledge; Lifelong learning to promote learning throughout the life cycle and help countries adapt to changing market demands. Science, technology, and innovation capacity to continually assess, adapt, and apply new technologies. Information and communications technology (ICT) to multiply access to learning opportunities to those who need them most (such as out-of-school youth and children with disability) and to improve the quality of teaching and learning outcomes

It is therefore pertinent to address the role of the university as the main agent in the HE education system of a KBE and to critically assess the efficiency and the manner in which individual HE institutions manage the available limited resources. It is also important to assess whether universities should be entirely state funded or should be moving towards being state supported and therefore generating third stream revenue.

3.3 Dealing with the challenge

The rationale for dealing with the relationship between state funded tertiary education and the knowledge economy has been stated correctly by Kaiser, Vossensteyn and Koelman (2001) when they write

> Public expenditure on higher education is a significant part of total public expenditure. This is justified by the crucial role higher education plays in the development of national economies and societies into knowledge-based economies and societies. Modern societies need to invest in teaching and research to keep up with the growing competition in the rapidly evolving global economy.

It is for this reason that we first explore Botswana's university education provision and make further enquiry into the efficiency of resource utilisation.

Many African state universities have remained public institutions and thus taken on a pivotal social responsibility of educating a work force for the local economy. The graduate output of universities has served the socio-political needs of the economy and therefore state funded universities have been considered to be public institutions that produced public goods. Naidoo (2003) writes

> The perception of higher education as an industry for enhancing national competitiveness and as a lucrative service that can be sold in the global marketplace has begun to eclipse the social and cultural objectives of higher education generally encompassed in the conception of higher education as a 'public good'.

If this places higher education as a commodity to be sold in global markets then a nation that invests in its HE and tertiary education will in turn enhance its global competitiveness; this then assigns the university an entrepreneurial role, which in turn should prompt policy reforms. Naidoo (2003) acknowledges that

> a major force underlying reform pressures in the present period is therefore the attempt by governments to harness public universities in a relatively unmediated manner to economic productivity and to reposition higher education as a global commodity.

There is therefore a shift from the roles and functions traditionally attributed to the university functions and roles to what we may refer to as an enterprising university. Therefore the functions of a university are more than training a work force for the economy but include production of new knowledge. The emergence of a new generation of private and entrepreneurial universities may be signalling change in HE provision. Sawyerr (2002) acknowledges the notion of the "commodification" of knowledge as having transformed the environment for knowledge institutions such as universities and other higher education organizations. The impact of commodification of knowledge is one that is bound to fundamentally change the funding and resource allocation of public universities. For this reason it is important to emphasise resource allocation models as central to financial efficiency and optimal usage of resources[14].

Universities may have to take on the challenge of knowledge production as a form of enterprise. Such a step would constitute a move away from the traditional university that has a social role and responsibility in the community to becoming an enterprising university that responds to education demands in the market. Therefore such a deviation from the existing role means the social impact resulting from government support will tend to diminish in favour of economic benefits. This may not be acceptable to state funded universities. Bollag (2003) writes that:

> Tertiary education plays a key role in the economic and social development of any nation…….No country can expect to successfully integrate in, and benefit from, this 21st century economy without a well-educated workforce. The stakes are particularly high for Sub-Saharan Africa (SSA), given the low level of education attainment of most countries'

[14] Resources are limited but they are also key to motivating university business activities, therefore resource allocation is very important.

> labour force, and the urgent need for sustained economic growth at a high level in order to reduce poverty.

This goes to show how SSA tertiary education and indeed higher education must continue to be concerned with training and development of human resources to replenish and sustain the labour requirements of the economy. This seems to be the immediate concern that effectively competes for attention in state funded universities.

Saint (2006) acknowledges in the foreword that the pressures on national governments to concern themselves with maintaining, or increasing, productivity and that:

> ....this concern has fostered a growing international interest in ways of stimulating innovation as a source of competitive advantage. Some of this interest has targeted institutions of tertiary education, recognizing their role in the generation and adaptation of knowledge to produce new ideas, improved technologies and more productive human resources[15].

Notably "The lack of well-qualified science and technology teachers and researchers is a widespread problem in developing countries, particularly in Africa, with its very small base of individuals who can create a science-oriented culture"(Peril and Promise, 2000).

It is evident from the above that building a knowledge economy is anchored in the capabilities of a country's human resource as well as that of the generation of new knowledge by its tertiary education system. To this end Botswana plans to make improvements in the relevance and equity of and access to education. The expected contribution by the new education system will be to empower citizens, through creating opportunity for continued and universal education with options to take up vocational or technical training as alternatives to academic study.

3.4 Transformation

Shumar (1997) sees transformation as involving the rearrangements of institutional structure, how education is viewed and changes in the subjectivities of actors involved such as students,

[15]Further it has been acknowledged that one way of encouraging institutional innovation within tertiary education systems is by creating an innovation fund, also called a competitive fund or a quality improvement fund. With it institutional systems, governments and development assistance agencies introduce or accelerate a positive process of adaptive change within teaching, learning and research programs.

teachers and administrators. Perhaps the direction and orientation of changes in this process is important but one should acknowledge that transformation is about rearranging the structure and how education is viewed. Bok (2003) notes that "many are afraid that commercially oriented activities will come to overshadow the intellectual values and that university programmes will be judged primarily by the money they bring in and not by their intrinsic intellectual quality." It is for this reason that in discussing commodification careful considerations (especially on the negative implications associated with it) are taken on board when addressing transformation. Dudestardt (2000) and Clark (1998) discuss different ways and steps of transformation hence the context in which it occurs is very important.

It is important to note that transformation in this case will be treated in the context of Botswana and the UB and as already noted the history of UB has its roots in its former colonial master's education system. This system has influenced the establishment of UB and reforms have since been undertaken in the past and continue to be performed to respond to new demands put on higher education by the economic development process of the country. Higher education institutions in Botswana have had to develop a multi-functionality of keep pace with the development and economic changes of one of the fastest growing economies in the world.

Perhaps the key term to focus on is the functionality of university education. Lebeau (2008) has this to say:

> Universities have frequently been regarded as key institutions in these processes of social change and development. The most explicit role they have been allocated is the production of highly skilled labour and research output to meet perceived economic needs.

Botswana's move away from manpower planning to emphasis a National Human Resource Development (NHRD) strategy together with the UB mission would seem to suggest the role of the university and its key function is to produce highly skilled labour.

Transformation can be defined as the process of developmental change characterised by reforms, remodelling of ideas and the energy and direction they supply for their transmission. Kogan finds that in England educational policy formulation makes use of phrases and terms such as 'transferable skills', 'developing analytic capabilities', 'competencies', 'excellence' and rigorous

use of evidence and capacity building. Through the use of these terms academics entrench higher education's contribution to economic instrumentalisation and vocationalism policies (Kogan, 2000). Parallel to this perception Guile (2003) recognises that:

> Policies are inclined, first, to equate learning with the *acquisition* of either recognised qualifications or certified knowledge and skills; second, to imply that opportunities for learning can be achieved either through the adaptation of the current educational institutional framework to increase individuals' *access* to learning, or, through the deployment of information and communication, to further transform *access* to different modes of learning; and third, to accept unproblematically that the constant *accumulation* of qualifications in order to meet pre-set national targets for education and training constitutes sufficient evidence of the creation of a learning society.

The key issues here are on the understanding of the process of learning as a vehicle for transforming society but going beyond accumulation of qualifications. It is further argued that "Learning involves the construction of new knowledge, identities and skills or the transformation (rather than the application or use) of something that has been acquired elsewhere" (Guile, 2003). Perhaps the emphasis in this quote is about making a point that construction of new knowledge and skills or transformation of existing knowledge is essential in learning.

> ….. the challenge for education appears to be to develop a more future-oriented perspective about the relationship between education and the economy that does not simply equate credentials as evidence of employability, or credentialist policies with the creation of a 'learning society'. Achieving this future-oriented perspective requires educational policies being reformulated to assist learners to develop a *transformative* rather than an *informative* relationship with the world. This implies having opportunities to participate, and the opportunity to work, with others to transform social practices in order to develop the knowledge and skill they will require for working and living in knowledge economies or societies. To explore what this might mean pedagogically, it will be essential to rethink what is meant by learning (Guile, 2003).

Notably there are different perspectives on learning but for our purpose we adopt the approach that views learning to be more than the acquisition of existing knowledge and skills but includes new knowledge acquired through research and good practice. The knowledge economy requires

more than knowledge acquisition; it requires production of new knowledge. It therefore poses a challenge on matters of research involvement to institutions that have traditionally remained teaching institutions. Research activities encourage generation of new knowledge and tease out new thoughts as well as new ways of using existing knowledge. An enabling policy and environment therefore have to exist to encourage research. The challenge calls for the reformulation of public education policy to prepare learners for working and living in a knowledge economy (Guile, 2003).

According to the World Bank (2005),

> "the transition to Knowledge Based Economies (KBE) requires four pillars of the Knowledge Economy Framework which are the Economic Incentive and institutional Regime, Education, Innovation, and Information Communications & Technology and two other variables are included to describe the economic and social performance. The major pre-requisites that are key in determining the situation and position of an economy are defined as:

- An economic and institutional regime that provides incentives for the efficient use of existing and new knowledge and the flourishing of entrepreneurship.
- An educated and skilled population that can create, share, and use knowledge well.
- A dynamic information infrastructure that can facilitate the effective communication, dissemination, and processing of information.
- An efficient innovation system of firms, research centres, universities, think tanks, consultants, and other organizations that can tap into the growing stock of global knowledge, assimilate and adapt it to local needs, and create new technology".

Making effective use of knowledge in any country requires developing appropriate policies, institutions, investments, and coordination across the above four functional areas[16].

To this end the tertiary education policy document entitled "Towards a knowledge Society" (Government of Botswana, 2008) is the appropriate reformulated public education policy to guide and transform the provision of higher education in Botswana. But is the UB strategic plan offering appropriate solutions to complement the tertiary education policy for Botswana? The UB has identified five priority areas listed earlier in which to engage on and two of these are discussed under 3.5.

[16] http://info.worldbank.org/etools/kam2005/

3.5 Some of UB Priority Areas

3.5.1 UB Priority Areas of Increasing Access and Widening Participation[17]

With the emergence of the knowledge economy, the ability to compete successfully is seen to rely on the production of higher value-added products and services (Naidoo, 2003). Naidoo (2003) has cited Carnoy, (1994) as having positioned higher education as a crucial site for the production, dissemination and transfer of such knowledge. In this sense, increasing and widening participation in higher education has come to be seen as a key policy area for governments and higher education institutions.

Generally, widening participation in higher education is brought about by a deliberate move to provide educational opportunities to the public through increased access to higher education. In some instances, widening participation in higher education has played a response role to new demands. Usually the diversified student populace, likewise the economic and labour market demands, would lead to changes in future careers, needs and specialities. In turn, such changes put pressure on the conventional education systems to change often very quickly. Conventional establishments are generally rigid in nature and slow to respond, sometimes leading to inefficient use of available resources.

It has been observed that inefficiencies drain scarce resources away from the fundamental objectives of increasing access, quality and relevance (World Bank, 2002). To this end it has become critical for nations aspiring to become knowledge economies to efficiently channel their resource towards producing marketable graduates and research outputs. The key performance indicators of universities remain embedded in research and graduate student outputs. There is yet

[17] The term increasing access refers to a means by which opportunities are made available to those who otherwise would not have had a chance to pursue education due to a variety of reasons. To achieve the above may require a variety of approaches that include flexibility, diversity of delivery modes curriculum pathways as well as inreach and outreach strategies of institutions. Increasing access is therefore presents challenges that impact on the funding, organisation and very often presents different conditions for teaching new kinds of students with diverse aspirations and academic talents (Trow, 1998 and 2003).
Widening participation in higher education is about extending opportunities for higher education (in this case university education) to the larger populace. It is about extending access and participation to those who might have missed the opportunities for university education for any reason. It comes in the form of extended access into full time programmes, opportunities offered through continuing education and lifelong learning. The extended access to fulltime programmes includes expansion in enrolments and increase in the variety of programmes on offer while in continuing education it would include distance education, part time and e-learning programmes. It is the above characteristics that make widening participation attract varied groups of students with needs and demands that are as varied as the students' population (Trow, 1998 and 2003)

another key indicator which has to do with the kind of programmes the university is involved in; that is the extent to which the institution is involved in Science and Technology related programmes. The World Bank is aspiring to apply its financial resources and extensive knowledge base toward increased efforts in the tertiary education and science and technology sectors (World Bank, 2002). However, it makes sense for economies aspiring to become knowledge economies to build their capacity by increasing science and technology programmes as well as other key areas of development offered in their HE institutions.[18] Therefore relevance may be judged on the basis of performance in different subject areas.

Chen and Dhalman (2005) writing for the World Bank acknowledge that "technical secondary education and higher education in engineering and scientific areas is necessary for technical innovation" but most importantly they recognize that "production of new knowledge and its adaptation to a particular economic setting is generally associated with higher level teaching and research". The World Bank strategy II identified recent trends in Africa such as a decline in the primary level enrolments and the demographic implications of HIV/AIDS; low tertiary enrolment levels characterised by a small university sector[19]; and a very slow post graduate education[20]. These circumstances present constraints to national innovation systems, research capacities, professionals, graduates with advanced technical and managerial skills and dynamic university-industry linkages (World Bank, 2002). It is with these matters in mind that one would want to deal with increasing access and widening participation of university education in Botswana (see Appendix A for UB's account of this process).

Samoff and Carrol (2004) make the following observation about Africa's higher education

> …..we learn that higher education is sorely failing. Higher education's contribution to development in Africa, the World Bank argues, is threatened by four interrelated weaknesses. The first two have to do with quality. Africa's graduates are both too numerous and too poorly prepared. Specifically, Africa's higher education institutions graduate too many teachers, but too few physical scientists, engineers, and social scientists, fields considered critical to development. Africa's higher education institutions generate little new knowledge. Overall, output quality is so low that higher education as a whole plays little useful role. The second

[18] The context of need for science and technology based programmes may be questioned especially because the destination of these expertise is the global market. If the human resource migrates to the rest of the world the benefits accruing to these expertises is amongst others the remittances and investments back to the economy. For these to be attracted back to the economy conducive environment should be in place locally.

[19] Except for Ghana, Nigeria, Kenya and South Africa

[20] Except for South Africa

> two have to do with costs and financing. Notwithstanding the low quality output, higher education costs are needlessly high. Based on a comparison of estimated private and social rate of returns, higher education financing is socially inequitable and economically inefficient.

The observation made here that the quality of African universities' output is low and the cost is socially inequitable and economically inefficient is a cause for concern. How can this be turned round? What will be the impact of an expanded access and widening participation on quality and costs?

3.5.2 UB Priority Area on Engagement and Entrepreneurship

UB's plans to establish alternative sources of funding include the establishment of a position of the Deputy Vice Chancellor of research and innovation with policy responsibility to oversee UB's research activities, graduate education, intellectual property, commercialisation of research and liaison with industry. This is an indication of UB's intention to venture into research and innovation. The effort to access external funding bodies, stimulate development and entrepreneurial activities and diversify the institutional funding is a welcome development. A deliberate move by UB to shift from an almost exclusive reliance on government bulk funding towards a greater reliance on new income streams obtained from research, consultancies, collaboration with business and campus activities is an indication of new beginnings to generating income. There are certainly efforts by UB to get alternative funding. But these efforts will not pay off if the expenditure is not guided and controlled through a resource allocation model designed to achieve the intended goals.

Liverpool, Eseyin and Opara (1996) confirm that budget and actual results which include expenditure control and allocations realised in African universities have frequently been out of alignment because of the unscientific way in which budgetary planning is done and allocations are made. It has also been identified that budget discussions tend to focus on the expenditure side of the equation with less attention to what goes on in the revenue side of the budget (Peterson, Dill, Mets & Associate 1997). The broad guiding principles of successful financial management that remain common to research intensive or teaching intensive institutions have been noted to include financial stability as key to successful academic work; prudent financial management, and understanding the financial indicators of performance; careful assessment of risk and when

accepted the investment should be generous to ensure successful outcomes; and ensuring that failures and shortfall are acted upon in an alert and effective manner (Shattock, 2003).

Since the public funding in many instances is not only diminishing but also changing form it is becoming increasingly important for new sources of funding to be identified; recently third stream revenue generation has been the main issue of discussion. For these reasons it is critical to discuss funding and resource allocation in UB.

Small developing economies do not have the resources and capacity to finance all their developmental needs therefore they have to make choices that are practical. The World Bank (2005) has defined parameters necessary for small developing economies aspiring to close the gap between themselves and the industrialised economies. In order to access the support offered by the World Bank such economies have to seek ways of working within the given parameters. Once the state has taken a position its funded institutions are compelled to work within the parameters it has set if they have to survive. For this reason it is important to work within the given framework. The World Bank (2002) has acknowledged financing reforms as being important and notes that:

> Reforms of the financing of public tertiary education, especially the introduction of tuition and other fees, are difficult to implement successfully unless educational opportunity is expanded through equity measures. Financing reforms also require significant devolution of government control in matters affecting institutional costs, as well as incentives for institutions to engage in cost-saving and income-generating activities. Student loan schemes may work well technically yet fail to promote improved efficiency and cost-effectiveness in tertiary education.

It is evident that cost-saving, cost effectiveness and income generating activities are important to promote improved efficiency. Commodification of knowledge provides an opportunity for development of systems, sub-systems, processes and structures upon which devolution of government control can evolve. Given that UB is advancing its reforms in the direction of servicing a knowledge economy and government is setting up a funding model to address fund allocation it is for this reason that the argument for the development of a resource allocation model is discussed with the view to augment national tertiary education funding reforms.

3.6 Conceptual Framework

3.6.1 Funding and Resource Allocations Models

Salmi and Hauptman, (2006) finds that funding and resource allocations models have followed variations of four allocation mechanisms to support the basic activities of tertiary education:

- Negotiated or ad hoc budgets
- Categorical or earmarked funds
- Performance-based funding.
- Funding formulas

3.6.2 Negotiated Budgets

The concept of negotiated budgets is implemented through line-item allocation to institutions. The line items have relatively rigid restrictions on how institutions can spend the public funds they receive from governments or other public bodies and the control and reallocation of these funds is done centrally.

3.6.3 Categorical or Earmarked Funds

Categorical or earmarked funds usually involve the government designating a particular institution to receive funds for a specific purpose. This type of funding is sometimes known as the non-base funding, also referred to as earmarked funding (Salmi J. and Hauptman A.M, 2000:p9). It is a pool of resources directed to a specific purpose and therefore provides steering flexibility and it is adept at addressing new goals. The institutions would generally want to attract income from the funding council and would therefore direct their efforts and energies towards those activities that would achieve their objective.

3.6.4 Performance-Based Funding

Performance-based funding tends to use performance indicators that reflect public policy objectives rather than institutional needs, as a basis for allocating funds. It links funding levels to some measure of outputs or outcomes, including incentives for institutional improvement.

3.6.5 Funding formulas

Funding formulas are popular and are the primary means to allocate funds to institutions for many recurrent expenses. The formulas vary on the basis of the factors used in their development and the type of organization that develops the formula. The factors include Priority-based funding; Costs per student; Inputs such as staff or students and Performance-based formula components (Salmi and Hauptman, 2006).

The funding council systems tend to influence the institutional systems through the parameters that they set. The parameters set by the funding council could generally be seen as market conditions upon which institutions would compete. Once these parameters are set the institutions adjust their activities to strategically position themselves for maximum benefits, hence changes to these parameters result in both positive and negative outcomes. The models that funding councils generally adopt tend to have similar features such as the base formula funding commonly referred to as block funding.

The block funding or block grants however tend to give institutions more flexibility and autonomy than line-item arrangements in determining how public funds are to be spent[21]. The key features of block funding are emphases on teaching and learning support. The teaching and learning factor draws its strength from two main drivers, the number of students in the institute and the price associated with the teaching and learning process. In this system, subjects are cost weighted thereby differentiating the course/programmes prices. The steering mechanism of block

[21] Nepal is an example of country that is currently considering moving from line-item budget to block grant financing as part of a reform aiming at giving tertiary education institutions more autonomy (Salim and Hauptman 2006).

funding is driven by an FTE head count and it is favoured because it provides operational stability[22].

Formulaic systems are stable, especially in a static environment, and allow managers to build and formulate expectations so as to better prepare for the future. They also allow for quick adjustments, hence flexibility. Institutions need to identify a system that enhances the efficient and effective resource management through, adaptability, flexibility, responsiveness, decisiveness, speed and quality.

Generally universities have the capacity to design models that can handle distribution and allocation of funds according to set priority specifications. One example of such a model is that of Liverpool et.al (1996), the formulaic model uses scientific processes in the calculation of distribution of resources between faculties and departments. It is a good guide as an operational tool but requires policy guidance and strategic plan inputs. Because of its formulaic approach it is more robust since it does not only depend on logistics and historical data. Therefore the formulaic model appears to be the best for equitable distribution of resources while the earmarked model would be appropriate for institutional development funding.

3.7 Summary

Change in the contemporary knowledge based society is forcing universities' knowledge production and dissemination in research and teaching to involve interaction with a variety of other knowledge producers and the use of information and technology. Changes in research, programme delivery and the academic and student clientele are most pronounced. The transition from mode 1 to mode 2 as discussed by Gibbons (1998) poses a challenge to many universities and the drive to continually innovate and produce quality output at efficient costs cannot be ignored by developing economies. However the creativity to configure knowledge resources

[22] Some of the funding indices that can be factored in the funding formula include **student-based** growth rate and enrolment mix, staff-student ratios. **Expenditure ratios** such as salaries to goods and services ratio or expenditure on academic to non academic ratios (Summary report by Liverpool L.S.O., Eseyin E.G. and Opara E.I Modelling for Resource Allocation to Departments and faculties in African Universities p.1) http://www.aau.org/studyprogram/pdfiles/liverpoo.pdf

would seem to be the best utilization of resources by developing economies since many of these countries may not have adequate resources to compete with industrialized countries.

The World Bank finds that an educated and skilled population that can create, share, and use knowledge well is key in determining the situation and position of an economy. Notably Botswana's aspiration to become a knowledge economy is the driving force in the changes that are being experienced at UB. The World Bank (2002) supports this view because it recognizes the process of innovation, investment in human resource development, cross-border collaboration, development of science and technology and producing well trained people as important in closing the gap with scientifically advanced countries.

Gibbons (1998) observes that to be operationally efficient universities may need to make use of the intellectual resources that they do not fully control. The World Bank (2005) concurs when it finds "An economic and institutional regime that provides good economic policies and institutions that permit efficient mobilization and allocation of resources and stimulate creativity and incentives for the efficient creation, dissemination, and use of existing knowledge" (Derek, Chan and Dahlman, 2005) to be a major pre-requisites for transition to Knowledge Based Economies. This essentially makes resource allocation a very critical matter. However critics of commodification present a convincing argument that commercialization of education will overshadow the intellectual values especially if university programmes will be judged primarily by the money brought in and not by their intrinsic intellectual quality. In a related view Shumar (1997) noted the significance of commodification being "a model to discuss the process by which the economic overtakes other institutions and aspects of social life" and thus suggesting that commodification has a negative attribute that promotes capitalism (Shumar, 1997).

3.8 Conclusion

If it is to succeed in enforcing its increasing access and widening participation priority area as well as adhering to knowledge economy demands the UB must rethink its resource allocation mechanism and model. The UB is compelled to deliver on the phenomenon of "commodification of knowledge" which requires research, innovation and entrepreneurship. Knowledge generation in universities is sometimes purely academic and may not align with

government or labour market requirements. Institutional leaders especially in state funded universities therefore have to balance the national aspirations with the academic pursuits of the university community. To this end UB should encourage research and innovation by motivating those who actively participate in it.

Entrepreneurship that seeks production of knowledge and the ability to derive economic benefit from it would have to be crafted on a continued access to public funding. This means the UB has to devote its resources to creating value for society first and value for science second. The need to nurture interests and facilitate creativity in the critical areas of science and technology programmes in the university education is also a pressing matter. This could be done through appropriate re-sourcing and appropriate resource allocation processes. Based on the above analysis the formulaic systems of resource allocation are stable and appropriate to support commodification of knowledge because they are adaptable, flexible and responsive in a changing environment. A resource allocation model that supports key education and human resource development variables for a knowledge economy should evidently reflect these characteristics. Strategic plans that align the institutional goals with appropriate resources would work best if motivated and supported by a conducive environment. This may also require reviews in programmes, courses and audits human resource requirements that are likely to yield the desired outcomes.

There is an understanding that by increasing access, quality and relevance in university education we increase national innovation systems' capabilities and research capacities, and increase the number of professionals and graduates with advanced technical and managerial skills. Since adaptation and production of new knowledge is associated with technical innovation, high level teaching and research in scientific and engineering subject areas will become necessary prerequisites for university education. Increasing access therefore implies massification of university education which would demand the intake from secondary education with pre-requisites in science and engineering subject areas to be given special attention. Is the above environment prevalent in Botswana? In the next chapter we discuss the method of enquiry and investigation strategy used to respond to issues raised in this chapter.

Chapter 4

4.0 Research Strategy and Methodology

This chapter describes and explains the research strategy design and methodology of this study. The adoption of the methods is an attempt to answer the central research question and fulfil the objective as stated in chapter one. This chapter discusses the different phases of study that include data collection methods, the scope, reliability and validity of the study. A description of the use of the Knowledge Assessment Methodology (KAM) as a diagnostic tool reveals the nature of comparative analysis conducted.

4.1 Research Strategy

In chapter one this thesis described the purpose of this research as being to investigate whether the UB resource allocation model enhances the capacity and capability of the university to respond to the knowledge production demands and skills development needs of the economy. Because Botswana aspires to become a KBE in which exploitation of knowledge plays the predominant part in the creation of wealth it is important to reflect firstly on the generation of knowledge, secondly explore implications of knowledge as an economic commodity that competes for resources to generate it as well as command value in exchange. Since literature points at higher education institutions, especially universities, as important contributors to the knowledge pool of an economy, we identify the University of Botswana as a key institution to Botswana's economy and seek to explore its contribution to the nation's aspiration.

This study looks into the efficiency of the resource allocations system at UB and whether it is one that would not only enhance the vision and mission of the institution but effectively contribute to the nation's aspiration. Secondly the study seeks to establish the weaknesses and strengths of systems and practices on the ground and their potential to support commodification of knowledge and ultimately the needs of a KBE. As demonstrated in the literature review the link between commodification of knowledge and the knowledge economy cannot be ignored. The period used in this study was deliberately chosen (between the years 2003 and 2006) to

capture the transformation being undertaken at UB that is characterised by leadership change at the UB accompanied by the innovations brought about by Tertiary Education Council, the national vision and the preparation of the National Development Plan 10. To this end this thesis uses a case study to explore the role of UB as a key player in knowledge generation.

A case study is one amongst several[23] ways of conducting research and it has advantages and disadvantages. Yin (2003) identifies three conditions that affect research strategies which have to do with a) the type of research questions b) the control an investigator has over actual behavioural events and c) the focus on contemporary phenomena and these apply to this case study. Case studies have been associated with process evaluation and in this case it is preferred for addressing commodification of knowledge as a process leading to output of knowledge products (Yin, 2003). In choosing a case study as a strategy in this instance consideration was given to its potential to capture explanatory and descriptive data and yet remain exploratory. As will be observed later the study covers contextual conditions that are embedded in the documented historical data (secondary data) complimented by survey data (primary data). Therefore the tendency for the strategy to produce similar outcomes of other studies was inevitable because of the historical background of the UB and the economy of Botswana. The commodification of knowledge and the knowledge economy phenomenon are contemporary in nature and in line with a case study approach as a research strategy choice.

Three phases were adopted in this study. First the documentary research starts with inspecting reports and classifying them into categories of policy, statistical, planning, and administrative or management documents. Statistical data was used to look for indications of efficient use of human resources, such as FTE of staff and students, student/lecturer ratio, type and nature of programmes on offer, while finance and accounting reports served to show the type and size of expenditure and the sources of revenue. The planning and policy documents were inspected to identify strategic issues and plans and their potential impact towards commodification of knowledge and KBE.

The second phase of research concentrated on the interviews which served to clarify, confirm, refute and/or corroborate documentary research outcomes. The semi-structured interviews

[23] Such as experiments, surveys, histories and analysis of archival information.

followed questions asked (see appendix B) which were not only complementing but facilitated the documentary research outcomes. The data collection process is segmented as shown under Table 3.

The research design involved collecting data by two methods with the aim to provide responses to the research question and its follow up questions. Table 3 is a framework showing how these were expected to produce results. The evidence gathered from documents shown in column II of the Table 3 helped to respond to the subsidiary research questions in Column I while the interview questions in column III served to collect data that confirmed, linked or connected practice within the UB and responded to the subsidiary research questions in Column I.

Table 3: Framework of Evidence Gathering

Column I	Column II	Column III
Research Question to be answered.	**Evidence from Documentary Data Search for evidence of:**	**Evidence from Interviews Questions asked to gather responses on the research question**
Is UB addressing the issues of commodification of knowledge and needs of a knowledge based economy?	• Policy documents • Needs assessment reports • Employment impact studies reports • graduate Appraisal reports (successful completion rates) • Patents and copy right records	a) Would you say your strategic plan aligns and facilitates your faculty's participation on the following UB goals? - Engagement and entrepreneurship? And - Increasing access and participation and how so? b) How is your faculty planning to make its outputs become viable for a knowledge economy?
Does the UB embrace commodification of knowledge? How?	• Connection of UB strategic plan to National plan • Evidence of reviews, task forces, consultation, restructuring, collection of data, seminars, workshops and other HE studies	a) Has there been an audit of the programmes and courses offered by your departments? b) Which programme or courses have been removed or suspended to give way for new ones? c) Has there been an audit of the human resource? d) Which HR areas need to be down sized or increased in your departments?

Column I	Column II	Column III
Research Question to be answered.	**Evidence from Documentary Data Search for evidence of:**	**Evidence from Interviews Questions asked to gather responses on the research question**
What support is needed to address commodification of knowledge and needs of a knowledge based economy?	• Statistical data of market surveys • Institutional Research plan and commercialised output • Connection of departmental strategic plans to national goals • Funding of market surveys • Adjustment of staff workload to accommodate extra curricula activities • Programme review output implementation plans	a) Do the figures in the UB's fact book reflect the staff complement of fulltime, fulltime temporary, part time lecturers and teaching assistants engaged in your faculty? b) Do the staff/student ratio in UB data a reflection of the situation on the ground? c) On average how many staff members resign or do not renew contracts? d) What do they cite as the main reason for their decision? e) On average how many articles get published by your departments in a year? f) How many researches are undertaken by your departments in a year? g) Have any of the outcomes been patented or registered? h) Would you say students in your faculty/centre have participated in researches?
Does the current resource allocation model support commodification of knowledge and needs of a knowledge based economy?	• Existence of a resource allocation model • Research plan and its funding • Output targets and funding • Input budget and control and funding	a) What should drive the resource allocation model of UB? b) Where do you think inefficiency is in the model? c) What are the strengths of the UB allocations model? d) What have been the weaknesses of the UB allocations model? e) What would you want improved in the UB allocations model and why?

In the third phase the study combined the data collected from the different sources. In combining both quantitative and qualitative data this thesis took advantage of data complementarity, facilitation and triangulation. Complementarity occurs when two research instruments are applied to different aspects of an investigation whereas facilitation approach refers to usage of one instrument in order to aid research using another strategy. While triangulation refers to different other notions that serve to cross reference several aspects of evidence collected but in this case the study adopts this notion in order to minimise the weaknesses in inherent in any one of the data collection methods used. It also used the quantitative research to corroborate qualitative research findings as well as verify and underscore issues (Bryman, 2001).

4.2 Data collection

The evidence was gathered from data collected through desk research and interviews. The tertiary education audit or baseline study made use of institutional reports and data, strategic plans and students' data reports from various institutions involved in education. It also included

consultancy reports, seminars and workshops by UB and the government where key players in tertiary education were invited to debate policy.

Institutional reports provided insights with regards to teaching and research, student enrolments, nature of research activity and programmes, programme development and reviews, mode of delivery, lecture class sizes, and faculty and departmental strategic plans. From a management point of view it was possible to capture and gain insights on the sources of funds, funding and allocation processes, management information system needs and requirements, the establishment of data bases and monitoring mechanisms and student enrolment processes. From the statistical data point it was possible to establish the student enrolment numbers, lecturer/student ratios, research activity data, graduate output data, staff data and projections in general.

The above contributed towards understanding UB's position within the context of Botswana as a knowledge economy as well as the changing environment of the tertiary education provision. It also helped to provide insights into the ideas being developed by government about education in general and tertiary education specifically. It was therefore possible to place UB's strategic plans within the nation's aspiration to become a knowledge economy and the regional challenges that hinge on the SADC protocol on education and training.

While interview data corroborated data from the documentary audit, interviews conducted with the UB leadership covering Deputy Vice Chancellors, Deans and Directors introduced other perspectives in term of ongoing business and practices, opinions or views, feelings and fears. An interview instrument was designed to go with the appointment time table. Four key sections were designed to a) elicit respondents' to share in general terms their role and functions in the university; b) comment on and explain their positions with regards to the two priority areas discussed earlier and how these translate into knowledge commodification; c) gather views and perceptions around funding and allocation of funds at the university; d) share their views about programmes, programme reviews, research and teaching output. All questions were sent to respondents in advance with a note to indicate that the questions were just a guide to allow them to prepare for the interview.

Interviews were recorded on Dictaphone and later transcribed. Respondents were informed of the purpose of the interview and were aware that they were being recorded before they consented to the interviews. Although the interviews followed the set of structured questions, there were follow-up questions depending on the response given. Interviews lasted between 45 minutes and one hour on average. Care was taken to avoid the use of leading gestures and personal notes were taken and later used for generating follow-up questions. The respondents were asked one question at a time and allowed to respond to each.

4.3 Data Analysis

Data analysis was divided into two broad areas: secondary data thus documentary data analysis and primary data analysis of UB respondents' interviews obtained through semi-structured interviews.

4.3.1 Documentary Data Analysis

The document survey was expected to reveal the areas of importance that would facilitate making judgements of the efficiency and effectiveness in resource allocation at the UB as well as show weaknesses embedded in the UB current resource allocation system. The data was therefore grouped into the following categories before it was analysed: Institutional Data Analysis; ITS; Resource allocation; Knowledge Output; Programme Review; and Research.

Under the institutional data analysis the question of adequacy, accuracy, validity and reliability of the data collected from institutional records was addressed with the view to establishing if UB management is using accurate data for management and policy decisions. In which case if it did not then inefficiency would be found to exist in the UB operations. The Integrated Tertiary Software (ITS) data source was investigated to establish if it was providing accurate real time as well as historical data for everyday operations and administration of faculty, departments and management. If it did not then efficiency of resource allocation would be challenged. Examination of the resource allocation area sought to find linkages in the use of institutional data in the budgeting processes and how these ultimately inform the allocation of resources process. The knowledge outputs area aimed at establishing the nature of quantity, quality and form and

the extent these are instrumental in the allocation of resources. It was indeed also important to establish how these interplay and/or interface with the marketability of the programme and employment opportunities. The programme review examination served to investigate the issues of relevance to the market and to the nation but most importantly its contribution to cost-saving measures. Investigation on the research activities of UB was conducted to establish and confirm the magnitude of engagement in creativity and generation of new knowledge by staff and students, but more importantly the extent of funding support received in this activity.

4.3.2 Analysis of UB Leadership Interviews

The data collected through interviews was analysed by grouping it in terms of the key sections outlined earlier but further divided into categories of data sources, the resource allocation system, programme reviews and research. The data was triangulated with that obtained through document survey to investigate a number of key issues.

In terms of sources of data the search was conducted to find areas were the respondents stated that they use needs assessment to start programmes, secondly that they do carry out periodic needs assessment, graduate market appraisal and/or market impact studies, thirdly that student feedback and other such related methods and data are used to decide the way forward. It also provided for an opportunity to establish whether the data resource bank of UB is used in the planning of academic activities. In using the resource allocation system line of enquiry there was hope that respondents would confirm (or not) the effectiveness and efficiency of the current resource allocation system. The programme review enquiry was used to search the respondent's responses with regards to their take on the nature of reviews, the extent of involvement of external stakeholders in the review of programmes and the implementation of the resolutions and or findings of reviews. Finally the research line of enquiry served to investigate the role of research and its place in the UB. The key issues however were to gather the respondents' responses to faculty, departmental and institutional plans with respect to UB's intentions and interventions towards increasing research output and changing the nature and focus of research outputs.

The interviews enquired into the respondents' understanding of the notion of commodification of knowledge as well as the extent to which their faculties are involved in it. Table 4 shows each respondent's magnitude of responsibility and has been design to facilitate anonymity of the respondents.

Table 4: Characteristics/Description of Respondents by Magnitude of Responsibility by Division size

Respondent	**DCA fa**	**DCB aa**	**D1 fob**	**D2 Edu**	**D3 sci**	**DR1 res**	**DR2 fin**	**DR3 ce**
Rank	**Executive management**	**Executive management**	**Senior Management**	**Senior Management**	**Senior Management**	**Senior Management**	**Senior Management**	**Senior Management**
Number of departments	43+	43+	3	10	8	43+	43+	2
Faculty size by number of students (2005-06)	15710	15710	1535	2738	1494	15710	15710	2265
Faculty size by number of Academic Staff Establishment (2005-06)	869	869	43	159	183	869	869	25+

Characteristics collated from UB Facts and figures to facilitated anonymity of the respondents.

4.4 Knowledge Assessment Methodology (KAM)

The KAM is the World Bank's internet based model designed to facilitate and retrieve data relating to key knowledge indices by country, as will be discussed later. In this research it was used as a diagnostic tool to identify and measure the strengths and weaknesses of the education and human resource indicators of Botswana against the region and the rest of the world. This way, pressures emanating from international standards and agendas are integrated in to the study.

KAM is a diagnostic and bench marking tool designed to help in understanding the strengths and weaknesses of countries and their competitors. It is useful for identifying problems and opportunities that countries may face and where policy may need to focus attention or where future investment may need to be directed in order to make the transition towards a knowledge economy (Chen and Dhalman, 2005). As an internet based tool it provides up to 80 structural and

qualitative variables that make up the four knowledge economy pillars. Because KAM has a large data base of 128 countries in 9 regional groupings it holds a large pool of data (dating from 1995-2007) against which to make comparison. It is on the basis of the cross-sectoral approach that comparisons in this study would pursue investigations with the quest to determine the extent of preparedness of the tertiary education system of Botswana to service the knowledge economy.

The KAM uses 14 variables selected to create a "basic scorecard". These variables represent the countries' knowledge index. KAM offers country indices of the most recent period where an average annual growth in GDP is calculated from the growth period of 2000-2004 while the rest of the variables are based on the period 2003 or 2004. At the other end its 1995 GDP calculations is based on the average annual GDP growth of the period 1994-1998. The indices of Botswana in the basic scorecard are thus the key starting point to this investigation.

This study adopted a framework based on the KAM explained above but only to emphasize the importance of the pre-requisite of "an educated and skilled population that can create, share, and use knowledge well" (Chen and Dhalman, 2005) as key to this work. Therefore because human capital[24] and knowledge resource[25] are key issues for this study it was necessary to compare Botswana's performance in these fields with the rest of the world average performance as well as with other countries within the region.

4.5 Sample Population

The study targeted stakeholders in tertiary education. These included the Ministry of Education which has overall responsibility for education and its funding; the Tertiary Education Council (TEC) for its responsibility as the new body that oversees tertiary education; the Botswana Training Authority (BOTA) for their role as the quality assurance authority of vocational courses and Botswana College of Distance and Open Learning (BOCODOL) as a government institutions directly responsible for increasing access and participation in some areas of pre-tertiary education.

[24]For UB this will include academic, administrative, staff training & development output and management support
[25] This includes research outputs, intellectual property rights, support structure or system, researched patented or copy righted knowledge and inventions

For internal stakeholders the focus was on the Dean of Education because of the faculty's responsibility in the training of educationists, the Faculty of Science and Faculty of Engineering and Technology because of the tertiary education policy position whereby scientific and technological research are seen as drivers of national advancement and wealth creation. The study also focused on the Faculty of Business because the same policy sees business knowledge as the source of economic power.

The study also targeted the faculty of engineering for its potential in leadership in several industrial engineering opportunities. The Director of International Education and Partnership (UB), Directors of all Centres of Excellence and Academic Centres were also targeted because they are directly responsible and accountable for implementing the UB strategic plans, while the Director of Financial services, DVC Academic Affairs (UB) and DVC Financial Affairs were needed to share their insights on the developments and challenges they face as managers of resources in an academic environment. The study focused on this sample population because the issues being raised are strategic and required insights from people in leadership of the institution especially during this transformation phase. This is not to deny the fact that other stakeholders such as lecturers and students would enrich the study. But the important issue here is the focus on leadership of the institution as being strategic to its success.

4.6 Reliability and Validity

The reliability of this study is embedded in the way the data was collected. Evidence gathered from documents is generally influenced by the circumstances and the way it was collected therefore it is important to triangulate it. It can be corroborated through other forms of data such as evidence from interviews in this case and it can be test for accuracy and correctness and inferences can also be made from such data. The data collected through interviews followed structured questions which were sent before the interview date thereby ensuring that respondents prepared themselves. The interviews were audio recorded and transcribed thereby reducing the incidence of incorrect recollection of statements. Therefore information missed out in the documented data can be collected at this point.

The evidence gathered through documentary research was triangulated with evidence gathered through interviews. The strength and reliability of case studies is embedded in the creation of a data base composed of case notes; audio transcripts and tapes, interviews, observations, document analysis and use of tabular presentation of survey and quantitative materials. As a result of the trail of information stored in different forms, reliability is also increased because evidence collected makes it possible for an external observer to follow a chain of events and incidences. It also makes it possible to trace the steps that lead to a particular finding.

The documentary data and interviews data were triangulated in order to establish consistence in issue under investigation. It also became possible to address a broader collection of issues. Therefore the convergence of the data generally points towards fact and therefore likely to be more convincing. Data triangulation therefore addresses construct validity which together with maintanace of a chain of evidence ensures no loss of evidence and avoidance of bias. Therefore the use of more than one source of evidence, the creation of a data base by a case study and maintanance of a chain of evidence ensure reliability and validity.

4.7 Ethics and Confidentiality

The respondents were requested for an interview and were informed of the nature of interview as well as what the data collected would be used for. They were sent questions in advance and given time to decide whether to give the interview. Before the interview the respondents were informed that the interview was being recorded and further asked to give consent. The respondents were therefore aware that their responses were recorded. While respondents introduced themselves they were assured that the information shared would remain between them and the researcher. The respondents' identities have been concealed by coding their responses in order to maintain confidentiality.

4.8 Conclusion

This chapter has presented the methodology that this research planned to follow. It has identified a case study as the strategy to be followed as well as demonstrated how data will be collected to address the research question and the subsidiary questions. It follows that an attempt to respond

to the objectives of the study would be made along the lines of the framework in Table 4. This chapter has provided the reasoning behind the selection of a case study being its strengths in the use of more than one source of evidence, the creation of a data base and maintanance of a chain of evidence.

In the next chapter this thesis will present the contextual issues of the economy of Botswana and places tertiary education in a broader sense within the context but more specifically it places UB as a key player in higher education provision. It also places research as a key driver of commodification of knowledge. In chapter five statistical and document evidence gathered to respond to the research question will be presented, it will also explore the conditions and systems through which UB's business is undertaken.

Chapter 5

5.0 KAM Diagnosis and the University of Botswana

In keeping up with the notion of knowledge economy, this chapter presents the outcome of the KAM diagnostic data and the external factors that put pressure on the operations of the UB. KAM diagnosis is used to place higher education activities in Botswana within the international context and present an overview of Botswana's key indicators of knowledge based assessment. This chapter also presents institutional statistical data from secondary sources and focuses on students' enrolments and academic staff and composition. It discusses and uses the data from UB sources and further discusses the implications these have on the operations of the institution.

5.1 KAM Diagnosis

KAM is used to benchmark the economy of Botswana with the world and the Southern African Development Community (SADC) countries that are competitors in human resource development and tertiary education performance. To this end Mauritius and South Africa were the preferred countries because of certain similarities such as per capita income, population size and economic transformation in the case of Mauritius and similarities on per capita income and land size in relation to differences in population spread in the case of South Africa.

5.1.1 Botswana-the Knowledge Economy

The 2005 weighted KAM scorecard of Botswana as shown in Table 5 which reflects a decline in human development index and tertiary education enrolment which can partly be attributed to the HIV/AIDS scourge.

Table 5:KAM Education and Human Resources (Botswana and the World)

Variable	Botswana		World
	2005	2008	2005
Adult Literacy Rate (% age 15 and above)	78.89	81.20 (2005)	84.09
Average Years of Schooling	6.28	6.28 (2000)	6.86
Secondary Enrolment	72.72	74.94 (2006)	74.51
Tertiary Enrolment	4.71	5.12 (2006)	28.06
Life Expectancy at Birth, years	38.10	35 (2005)	67.05
Internet Access in Schools	2.50	2.80 (2007)	3.80
Public Spending on Education as % of GDP	8.60	10.70 (2006)	4.45
Prof. and Tech. Workers as % of the Labour Force	11.50	12.16 (2004)	19.97
8th Grade Achievement in Mathematics	n/a	366.00 (2003)	488.30
8th Grade Achievement in Science	n/a	365.00 (2003)	488.30
Quality of Science and Math Education	3.80	3.80 (2007)	4.18
Extent of Staff Training	3.50	3.80 (2007)	3.91
Availability of Management Education	3.30	3.40 (2007)	4.30
Well Educated People Do Not Emigrate Abroad (Brain Drain)	4.76	3.50 (2007)	3.59

Source: http://info.worldbank.org/etools/kam2005/weighted/scorecard_adv.asp

According to the KAM scorecard result shown in Table 5 except for a few areas Botswana has experienced a positive growth. The KAM Education and Human Resources indicate that majority of the variables in this area compare well with the rest of the world except for tertiary enrolments; 8th grade achievements in science and mathematics as well as in the life expectancy at birth and professional and technical workers as a percentage of the labour force.

A low percentage of professional and technical workers in the national labour force is indicative of the challenge that tertiary education should work on. It is an area that puts direct pressure on tertiary education institutions and is made worse by the nation's aspiration of becoming a knowledge economy. It is important to be mindful of the increase in index of migration of well educated people because it is suggesting a change in their behaviour and possible saleable or tradable certain skills from Botswana[26].

In designing the Botswana funding and allocations model the TEC has identified Mauritius as a good country to benchmark against because Mauritius like Botswana has a small population, a comparably good per capita income and has in the past economically relied on one commodity (sugar). However Mauritius has successfully improved its human resource and its education participation rates are higher than many countries in the SADC region. South Africa on the other hand has undergone reforms in tertiary education and has been undergoing transformation in

[26] Botswana has seen many nurses leave the country to work in developed countries.

higher education. South Africa has a comparably higher per capita income as well; however because of its land size and per capita income it is considered a good model for similarities and comparison. It is also ideal for comparison of population spread and resource distribution. For this reason it was important to look at the performance of the two countries in the knowledge assessment and the Table 6 shows the KAM results.

Table 6:KAM Education and Human Resources (Botswana, South Africa and Mauritius)

Variable	**Botswana** (Group: All Countries)	**South Africa** (Group: All Countries)	**Mauritius** (Group: All Countries)
	actual	actual	actual
Annual GDP Growth (%), avg 2001-2005	5.80	3.80	4.20
Human Development Index, 2004	0.57	0.65	0.80
Tariff & Nontariff Barriers (0-5), 2007	59.60	68.80	70.00
Regulatory Quality, 2005	0.76	0.59	0.32
Rule of Law, 2005	0.70	0.19	0.79
Royalty Payments and Receipts (US$/pop.) 2005	7.10	23.80	3.90
Technical Journal Articles / Mil. People, 2003	42.20	51.60	13.30
Patents Granted by USPTO / Mil. People, avg 2001-05	0.00	2.71	0.00
Adult Literacy Rate (% age 15 and above), 2004	81.20	82.40	84.40
Gross Secondary Enrolment, 2005	75.10	93.40	88.60
Gross Tertiary Enrolment, 2005	4.50	15.60	16.90
Total Telephones per 1,000 People, 2005	541.10	825.20	862.50
Computers per 1,000 People, 2005	45.20	84.60	278.70
Internet Users per 1000 People, 2004	34.00	108.80	145.90

Source: KAM scorecard accessed in April 2008

Botswana's annual GDP average percentage growth is comparatively better than the other two countries with a significant presence of articles in technical journals. It is evident from the data above that Botswana is lagging behind when compared to South Africa and Mauritius in the areas of Human Development Index (2004), gross tertiary enrolments (2005), gross secondary enrolments (2005), computers, telephones and patent registration although its performance in other areas is relatively good. It is with these in mind that one wants to explore university education developments in Botswana.

The KAM diagnosis brings forth evidence of the challenges facing Botswana with respect to educating for a knowledge economy and indirectly the role of the UB as a public funded

institution of higher learning. Based on the KAM scorecard outcome the challenges for UB can be outlined, as being to improve the research activities, enhance the entrepreneurship drive, and engage rigorously in improving the pre-tertiary science and mathematics education. UB has made efforts to address some of these aspects by, for example, creating a business centre, the legal clinic and other centres, but there is a lot more to be done to translate these into actions that produce tangible and visible outputs. The university programmes need to be adjusted to address the skills component most wanted by industry and the research needs to be market led. To do this there is need to produce real time data for decision making. It is however noted that the priority areas should not be exclusive to science and technical knowledge but proportionately address business and social sciences as well.

5.2 External Pressures

It is noted that although the economy of Botswana has progressed from a social welfare orientation towards a capitalist economy the rate at which education has adjusted to the changing economic environment has rather been slow. There has been a significant awakening to the changes in the last ten years which was based on the revised national policy and it has rather focused on the pre-tertiary basic education. In recent times a more significant and on-going development is that of the tertiary education policy and a concerted effort towards designing and crafting a policy on early childhood learning. A number of consultancies commissioned by the ministry of education, TEC and UB have yielded reports that identify problems in the current education systems.

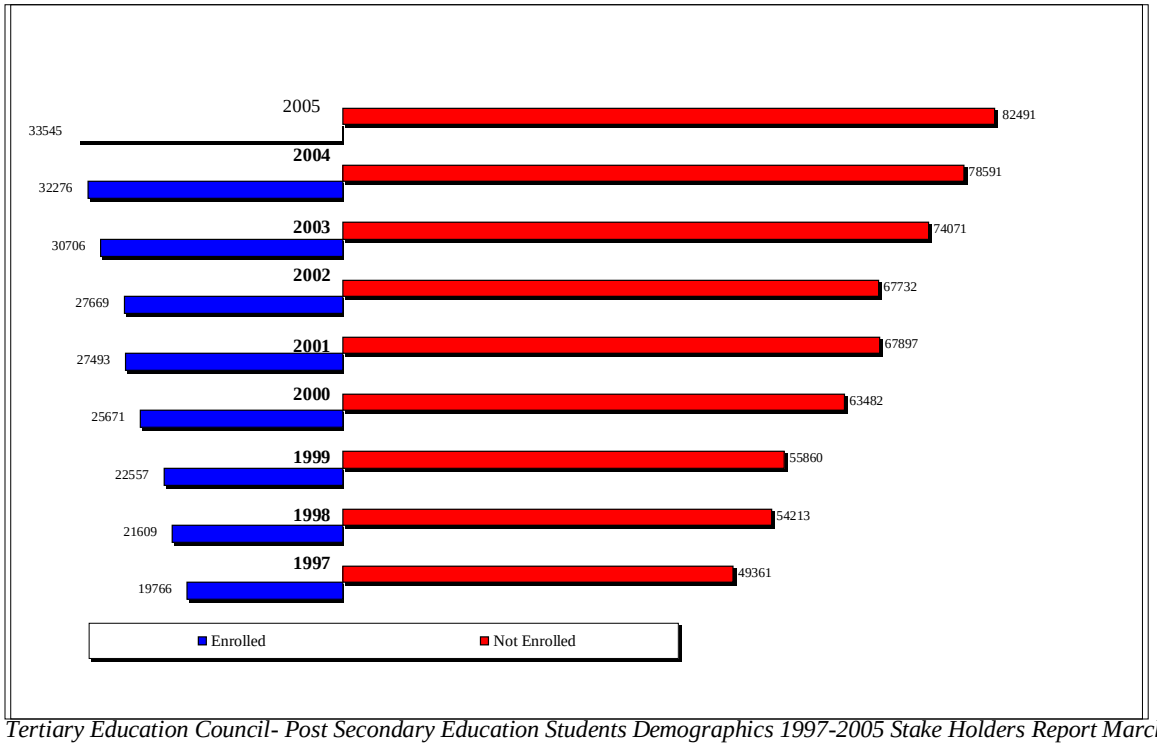
The existence of TEC to restructure and re-systematise tertiary education has brought with it a number of reforms; the National Qualification Framework (NQF) which once completed is likely to lead to streamlining of qualifications and institutions will be able to choose areas and levels of qualifications to offer. It has also brought the National Human Resource Development Strategy (NHRDS) which is likely to compel institutions to identify areas of specialisation with plans to address a national human resource need or demand. The quality assurance systems has seen BOTA and TEC institutions set regulatory frameworks for tertiary institutions, especially with regard to course and programmes articulation. Finally the establishment of a national funding model will benefit institutions that will conform to parameters set by the model. There is,

however, no guarantee that the parameters expected to be set by the national funding model will support and favour individual institutional objectives and therefore third stream revenue will still be a necessary issue to pursue.

The thrust of research and innovation as seen from the tertiary education policy position is for scientific and technological research to become the drivers of national advancement and wealth creation; business knowledge to be the source of economic power; and humanities and social science research as the key to social, cultural, and personal transformation and development. This comprehensive position has to be translated into action, coordinated and interlinked across different institutions, disciplines and student population.

Figure 5.1 shows the demography and growth pattern of students who do not get enrolled into tertiary education and for those who get enrolled from amongst post secondary education who are qualified to enrol. On average about 29% of the student population qualifying for tertiary education get enrolled into tertiary education leaving 71% not attending public institutions. This puts pressure on tertiary education provision as a whole.

Figure 5.1: Proportion of Post Secondary Enrolments for candidate aged 18-24: 1997-2005



Tertiary Education Council- Post Secondary Education Students Demographics 1997-2005 Stake Holders Report March 2007

The above diagram shows the proportion of post secondary education persons between the ages 18-24 years who are enrolled (on the left) or not enrolled (on the right). It is made up of post secondary public institutions tertiary enrolments of (university of Botswana, Botswana College of Agriculture and colleges of education) and non tertiary training (institutes of health sciences, technical colleges, Brigades and others)[27]. The evidence is that the tertiary education participation rate is low and will need to be improved. There may be a variety of reasons that lead to this situation, these may include that UB cannot accommodate all the qualifying candidates, candidates have school leaving results that do not qualify them for specific courses at UB, mismatch between the students preferences and the programmes on offer, a mismatch between students placement sponsorship requirements, national manpower needs and students preferences and choices or ignorance on the part of the students.

The 71% students not enrolled into public tertiary education over the years cumulatively increases the population of students that require tertiary education or other forms of training. There is therefore an opportunity for private tertiary and post secondary education provision to be offered by those willing. However is government willing and able to sponsor this group of students? While this matter may be a national issue of access and participation it is partly a responsibility of university, technical, vocational and professional training institutions to address it. How is UB dealing with its internal capability and positioning to address the situation? A commitment to lifelong learning and distance education would increase access and participation. It would be a welcome development which requires human and capital resources to support it.

The students' choice of programmes and scholarship distribution according to areas of disciplines is another external force. It is expected that the NHRD and the NQF are most likely going to influence students' decisions in making choices. Students are likely going to shop around for institutions that offer the best programmes and will work within the parameters of scholarships available. The determining parameters are likely to include competitive grades, marketability of the qualification and chances of getting employment locally and internationally.

[27] This leaves other training such as that of Botswana Accountancy College, Botswana Institute of Bankers, Botswana College of Open and Distance Leaning and other private universities and institutions accounted for as other non tertiary.

Indirectly this puts pressure on the local institutions to place themselves and the programmes they offer amongst the best in teaching and research. How has the UB performed so far?

5.3 The University of Botswana

The development trends and changes that have taken place at UB within the last 3-5 years are evidence to the transformation in the institution. Evidence gathered from the institutional data sources is used to discuss issues relating to resource allocation, teaching and research. Data sources include documents such as 'UB Facts and Figures' and data generated from the UB Integrated Tertiary Software (ITS) data source and data from these sources would be compared by data collected from interviews with UB leadership. Because teaching and research activities are key university business this chapter focuses on teaching and later discusses UB research activities.

5.4 Documentary Evidence

There are several policy documents that indicate that UB is undergoing transformation. These include Intellectual Property Policy (2004), Research and Development Policy (2002) , Learning and Teaching Policy (2008), Academic Quality Management Policy (2003), Distance Education Mainstreaming Policy (2003), Policy on centres of study (2004), Policy on Internationalisation, HIV/AIDS Policy (2002), and others. A more structured approach to planning in the form of institutional, departmental and faculty strategic plans is evident, showing that the university is positioning or repositioning itself for new challenges. These are embedded in the institutional plans such as Shaping our Future; UB's Strategic Priorities and Action to 2009 and Beyond (2004), University Research Strategy (2008), Student Enrolment Plan (2003), University Development Plan-UB Beyond 10000 (1999); A Strategy for growth (2000) and others. There are a number of consultancies and task forces set to undertake studies and review the structures and systems in UB an indication of that reforms are underway these include General Education Task force, Procedure for UB programme Approval, a comprehensive external programme review exercise and others.

Much of this study focused on the availability of critical information necessary to design an efficient resource allocation model that can compute desirable results; a model that will ensure

efficient use of human resource input and commodified knowledge. To this end the institutional data base was investigated. Because a data base is made out of different information sets which depend on systems designed to collect it, three broad areas were used namely a) teaching and learning b) funding c) research and, additionally, community involvement which cuts across all the three areas.

5.5 Institutional Statistical Data Resources

Although in a strict sense UB's statistical data resources are yet to be configured into a data base there is some data for general management and administration use to work with from the UB Facts and Figures and UB Integrated Tertiary Software (ITS) data. There are other specialised and more specific sources of data ranging from technical reports, needs assessment reports, examinations results and archives, research records, staff/human resource or personnel records, policy document, accounting records and others that specifically contribute to the Management Information System and to the institutional data base. Although some of these data sources may be outdated they are a viable and reasonably good starting point that can be used to develop a database.

5.6 ITS Data Resource

Although the ITS system has a number of good features and packages for institutional data collection, upon enquiry it was established that in UB some of these features had not been fully utilized; secondly the data input to the system was found lacking. For example the UB has not utilized the ITS distance learning module; a number of processes for capturing information have been missed out. However, training is still on going to improve the data collection and inputting process.

Since some of the institutional business processes have not been well defined it is difficult to know the kind of data to be captured. For this reason the service providers may not have configured appropriate instruments to capture and link data in the collection process. Therefore the ITS remains limited in its use because as a database system it lacks the necessary links between human resource and student data; it captures historical data and misses the real time links. Because the data collected through ITS has a significant bearing on the budgets and real

time decision making, the above situation impacts negatively on the efficiency of resource allocation. It is therefore agued that the usefulness of the ITS data is embedded in its ability to facilitate and connect the cost centres with faculty objectives, which seems not to be happening in UB. Therefore the inadequacy of data impacts negatively in the resource allocations system.

5.7 UB Facts and Figures

As a result of the difficulty with the ITS data source there has been a tendency to rely heavily on the data from UB Facts and Figures reports. Facts and figures data shows a various information collected from faculty, department and centres, covering programmes offered, enrolment, financial (revenue and cost) and human resource data. A closer inspection of this data is addressed within the broader areas of teaching and research.

Students at UB can enrol on approximately 27 academic programmes at the certificate/diploma level, 37 at the bachelor's level, 1 at the postgraduate diploma level, 32 at master's level and 14 at the MPhil/PhD level (UB Facts and Figures, 2005/06). This effectively makes UB to be seen as mainly a teaching university because many of its undergraduate and post graduate programmes are taught.

5.8 Teaching

5.8.1 Undergraduate Enrolments

UB has increased its enrolments on the fulltime programmes as well as introduced distance learning to expand access to tertiary level education. In the last few years it has gradually increased its PhD students' enrolment. The Table 7 presents a summary of key data profiling UB enrolments.

Table 7: University of Botswana Enrolment and Key data Profile (2002-2006)

Academic year	**2002/2003**	**2003/2004**	**2004/2005**	**2005/2006**
Students enrolled	12 783	15,425	15,725	15,710
Enrolment growth rate	-	17	2	0.09
Percent full-time students	86	85	81	80
Percent part-time students	14	15	17	17
Percent distance students	0	-	2	3
Percent female students	50	50	52	53
Percent undergraduate certificate/diploma	28	24	24	24
Percent undergraduate degree students	64	68	67	67
Percent postgraduate diploma students	3	3	4	3
Percent masters and (number of doctoral students)	5(16)	5(13)	5(21)	6 (34)
Percent Botswana citizens students	93	94	94	95
Percent international students	7	6	6	5

Source: University of Botswana Facts Book 2004-2006

Table 7 shows that during the academic year 2003/2004, the student enrolment increased significantly to 17% and has not increased by more than 2% subsequently. Meanwhile the fulltime candidates as a proportion of the students' population dropped from 86% in 2002 to 80% in 2005 because of the increase in the part time students and the introduction of distance learning programmes. Although the percentage of certificate/diploma undergraduates initially dropped from 28% in 2002 to 24% in 2003 and it has remained stable and consistent. There was a 4% increase in the undergraduate degree enrolment from 64% in 2002 to 68% in 2004 and it has remained at 67% since then.

The UB through its Centre for Continuing Education (CCE) has started distance education programmes with a view to increasing access and participation in university education. The increases in part-time, distance learners, masters and doctoral students is an indication of new developments. The proportion of the international students dropped by 1% between 2002 and 2006, however only 2% of the student population is from the SADC region. This is 3% short of the targeted 5% of SADC students' participation. The UB has established an international relations office to facilitate and promote the student and staff exchange programmes.

5.8.2 Graduate Enrolments

UB's enrolments on post graduate programmes are low and as a result graduate research output is also low. As shown in the Table 7 the post graduate students' enrolment increased from 699 in 2002/03 to 931 in 2005/06 out of which 34 are Doctoral students. From the 34 doctoral students 18 are enrolled for science programmes.

Table 8: UB Post-Graduate programmes and Enrolments in the area of Science and Technology Related Subjects

Academic year	**2002/2003**	**2003/2004**	**2004/2005**	**2005/2006**
Students enrolled (all levels)	12 783	15,425	15,725	15,710
Total masters (Number of doctoral students enrolled)	699(16)	796(13)	779 (21)	931(34)
Business Administration	111	145	131	138
Science	73	85	99	129
Master of Philosophy (Applied Microbiology)	2	2	0	0
Master of Philosophy (Chemistry)	12	15	10	6
Master of Philosophy (Mathematics & Science Education)	0	1	0	0
Master of Philosophy (Physics)	1	2	2	2
Master of Philosophy (Environmental Science)	-	11	9	9
Master of Philosophy (Mathematics)	0	0	2	0
Doctor of Philosophy (Applied Microbiology)	1	2	2	1
Doctor of Philosophy (Chemistry)	4	4	2	5
Doctor of Philosophy (Environmental Science)	3	3	5	7
Doctor of Philosophy (Mathematics)	3	1	2	4
Doctor of Philosophy (physics)	-	-	-	1

Source: University of Botswana Facts Book 2004-2006

The focus in the data in Table 8 is on science and technology programmes specifically because the tertiary education policy identifies these areas as the drivers of national advancement and wealth creation. Further to this, knowledge in these subject areas is one that is globally demanded and therefore marketable.

Table 9: Student Enrolment by Faculty/School

Academic year	**2003/2004**	**2004/2005**	**2005/2006**
	Percentage growth rate (year on year)		
Business	-31.2	123.1	8.3
Continuing Education	12.7	29.9	0.9
Education	17.1	8.4	-6.0
Engineering & Technology	22.2	-13.4	-5.0
Graduate Studies	9.9	1.3	19.8
Humanities	21.5	-3.0	-2.4
Science	12.6	-5.0	7.0
Social Sciences	23.2	-3.3	-3.4

Source: University of Botswana Facts Book 2004-2006

Statistical evidence shows that the enrolment of Engineering & Technology, Humanities and Social Sciences has declined for the periods of 2004-2006. There is reason for concern stemming from these figures because engineering and technology should be taking the lead given the focus from the tertiary education policy. Although the year 2004/05 was generally characterized by a decline in four faculties the faculty of Business more than doubled its intake, a move that is consistent with the UB policy position.

The spread of students across disciplines in terms of the UB's student enrolment plan is to have Business and ICT account for 20%, Science, Engineering and Health Sciences, 27%, Education, 20% and Humanities and Social Sciences 33% (UB Student Enrolment Plan 2003). This is in line with the tertiary education policy which sees "humanities and Social Science research as the key to social, cultural, and personal transformation and development" (TEC, 2006).

Table 10: Student Enrolment by Faculty/School as a Percentage of the Total Annual Enrolment

Academic year	2002/2003	2003/2004	2004/2005	2005/2006
Business	7	4	9	10
Continuing Education	12	11	14	14
Education	18	17	19	17
Engineering & Technology	10	10	9	8
Graduate Studies	5	5	5	6
Humanities	21	21	20	20
Science	10	10	9	10
Social Sciences	16	16	16	15

Source: University of Botswana Facts Book 2004-2006

The trend has been that humanities students (20%) form the highest proportion of the total students' population throughout the years, followed by education (18%) and social sciences (16%) as shown in Table 8:- on average Science and Engineering & Technology have remained at 10% and less. However the proportion of students enrolled for science, engineering and technology put together has declined from 20% (2002/03) to 18% (2005/06). This could be translated to mean that the future output of science, engineering and technology into the market amounts to 20% or less. This is therefore not a good indication as it does not align with tertiary education council view that sees "Scientific and technological research as a driver of national advancement and wealth creation" (TEC, 2006).

5.9 Resource Allocation

5.9.1 Human Resource

The most important resource in a university is its human resource: for this reason this section considers the staff establishment and allocation across the faculties, departments/centres and by cadre. The number of academic staff in post is particularly important in that UB experienced a decline in the professorial cadre from 2003/04 with a high of 13.2% (Table 11) in 2004/05. There continued to be an increase in all other areas with a significant increase in the associate professorship cadre in 2004/05 and senior lectureship in 2005/06. The engagement of new staff at lecturer level has remained minimal but increasing. A cumulative analysis shows that there was a general decline in the professorial cadre during 2003/04.

Table 11: Academic Faculty in Post

Academic year	2003/2004	2004/2005	2005/2006
	Percentage growth rate		
Professor	-2.6	-13.2	-3.0
Associate professor	-20.7	17.4	7.4
Senior lecturer	-0.7	8.8	11.3
Lecturer	1.1	2.8	2.8

Source: University of Botswana Facts Book 2004-2006

The low growth rate of the academics in post does not seem to complement the potential impact of teaching loads reflected by the enrolment growth pattern. The percentage increase in senior lecturer cadre may be an indication of a positive development in the quality of teaching and lecturers. This is because one expects senior lecturers to have gained experience over the years and would have researched and published in their area of expertise therefore better able to teach their subject area.

It is important to note that the strength of post graduate education is reflected by the presence of the professorial cadre. Therefore the decline in the professorial cadre may be having a negative impact on graduate education at UB. It should also be a cause for concern as this may be a reflection of unattractive conditions of employment. However it is important to see how this is spread across different faculties and shown in Table 12.

Table 12: Faculty Academic Staff Establishment Full Time Equivalent (FTE)

Academic year	2003/2004	2004/2005	2005/2006
Faculty/Centre	Percentage growth rate		
Business	2.5	4.9	0.0
Continuing Education			
Education	5.5	2.6	0.6
Engineering & Technology	5.7	16.2	2.3
Graduate Studies			
Humanities	3.0	3.9	2.8
Science	6.0	1.7	2.2
Social Sciences	5.0	4.7	3.0

Source: University of Botswana Facts Book 2004-2006

Table 12 shows that the overall academic staff establishment shows a continued increase from the period 2003/04 to 2005/06. However it can be observed that the Centre for Continuing Education (CCE) and graduate studies school do not seem to have academic staff although they have students enrolled in their programmes (Table 10 & 12). This affects the students FTE as well as the lecturers' workloads.

Table 13: Average Staff and Student Ratios

Faculty of	2004/05	2005/06
Business Departmental Staff Student Ratio(SSR)	1:48	1:29
Education Departmental Staff Student Ratio(SSR)-	1:26	1:18
Eng. & Tech. Departmental Staff Student Ratio (SSR)-	1:15	1:06
Humanities Departmental Staff Student Ratio(SSR)-	1:36	1:20
Science Departmental Staff Student Ratio (SSR)-	1:25	1:17
Social Sciences Departmental Staff Student Ratio(SSR)-	1:39	1:23

Source: University of Botswana Facts Book 2004-2006

The staff/student ratio for Business is recorded as 1:48 being the highest and for Engineering and Technology at 1:06 is the lowest during the period 2004-2006. The ratios show an improvement in all faculties. The computation of the ratios is brought to question especially considering that the increasing student enrolment for the Faulty of Business is accompanied by no growth in staff establishment.

The overall student enrolment numbers at undergraduate level at UB indicate that teaching is the principal activity compared to other activities in UB. Therefore UB's ambition to compete for the undergraduate programmes must be accompanied by appropriate adjustments in the teaching staff. However, if UB plans are to move away from teaching undergraduate programmes there should be evidence of increased postgraduate and research activity.

Table 14: Support and Industrial Staff in Post

Academic year	2003/2004	2004/2005	2005/2006
	Percentage growth rate		
Executive Management	0	0	0
Senior Management	9.1	16.7	7.1
Management	13.3	5.9	6.9
Support & Industrial class	4.4	-2.2	-0.5

Source: University of Botswana Facts Book 2004-2006

In considering the growth pattern of support and industrial staff in post, a significant growth is recorded at the management and senior management level during the period 2003/06. Meanwhile there was a decline in support and industrial staff. The change in staff composition and growth signals change in university strategy during the period 2003/06. It is not clear what motivates the shift.

5.9.2 Funding the UB

It is evident from the earlier discussion (chapter two) that UB collaborates with other institutions and non-government organisation in a variety of projects and therefore receives external funding for specific projects. Government funding however remains the major source of revenue. Government subvention gradually declined from 2003/04 where it constituted 80% of the total revenue to 74.5% in 2005/06. Revenue generated by the UB has remained below 25% except for the year 2005/06. As noted earlier the UB and colleges of education have had a declining percentage from 4.8% in (1996/7) to 3.0% in (2004/05)[28] of recurrent expenditure budgets which has been accompanied by an average 1.6% decline of the development expenditure budget during the same period. This is the cause for concern and is the basis for the need to be prudent in the utilisation of these funds.

5.9.3 Budgeting and Resource Allocation

Resource allocation at UB is conducted through a consultative budgeting process (negotiated budget) that involves a number of committees from departmental to faculty and eventually ending with Planning and Resource Committee (PRC). The PRC utilises information from the budget and control office to put together necessary statistical data that facilitate allocations and makes recommendation to the Finance and Audit committee of the UB council. The incremental budget process[29] used by UB adjusts for inflation and is guided by the line items and ceiling amount set by government. It appears like data from institutional sources or management information is fully considered in the allocation of resources. The budgeting process therefore effectively is the allocation mechanism in use at UB.

[28] See Botswana statistical Year Book 2004 volume 29 No. 1-4 p112-118

[29] The incremental budget provides for the faculty or department to adjust its budget items by some percentage and further justify its adjustment.

5.9.4 Revenue and costs

Table 15 shows the percentage of revenues and government subventions that have been utilised from 2001/02 financial year to 2005/06 and the percentage share of total cost. These have been placed against the percentage annual growth in order to appreciate the magnitude of changes affecting the finances at UB.

Table 15: Annual Revenue and Expenditure 2001-2006

Financial Year	**2001/02**	**2002/03**	**2003/04**	**2004/05**	**2005/06**
Revenue Generated as a % of total revenue	23.8	23.1	19.9	23.6	25.5
Govt. Subvention as a % of total revenue	76.2	76.9	80.1	76.4	74.5
Total Revenue	100	100	100	100	100
Staff Costs as a % of total expenditure	56.8	60.7	62.8	62.2	67.3
Other Operating Costs as a % of total expenditure	43.2	39.3	37.2	37.8	32.7
Total Expenditure	100	100	100	100	100
Percentage growth of Students enrolled	-	-	17.1	10.8	-0.0001
Percentage growth of Govt. Subvention	-	0.7	3.2	-3.7	-1.9

Source: University of Botswana Facts Book 2004-2005

The government subventions were on average of 76% except for a significant one off case of 2003/04 which was driven by a deliberate plan to expand enrolments. There has been a continuous decline of government subvention from 2003 to 2006 in nominal terms and real terms. Revenue generated by the UB in nominal terms on average has remained the same and even slightly improved (see appendices C).

The cost analysis of UB shows that staff costs have continued to increase from 57% of total expenditure in 2001/02 to 67% in 2005/06. Meanwhile operating costs have declined from 43% to 32% of the total expenditure. This reflects that overall, government subvention is used to cover staff costs and therefore a critical look on the productivity levels of staff may prove a good starting point.

5.10 Key Areas of University Activity

5.10.1 Research

The records from the Office of Research and Development (ORD) show that at the time of data collection there were about 160 on-going researches projects in the UB, out of which 8 were led by professors[30]. Documentary evidence gathered from Facts and Figures shows that research has been receiving 2% of the institutional total budget. Notwithstanding the above UB is home to some journals; for example, *Mosenod*i which is focused on education matters, *Lonaka* a bulletin dealing varying contemporary issues of teaching and learning, the *University of Botswana Law Journal* with a focus on legal issues, the *Pula Journal* and *Botswana Journal of Business*.

Although students have participated in research they have done so as research assistants especially during data collection and processing, or when doing a research project for their programme of study. The involvement of students in research as a way to groom them does not seem to have been practised to significant proportions. There is however expectation that student involvement in research will be increased. The Institutional research strategy has also been released (2008) and with it the following key objectives will be pursued: To increase staff participation in research; To increase and enhance student research training; To increase internal and external research funding; To increase international collaborative research; To increase the volume and quality of research outputs; To enhance the impact of research; To improve the integration of research and teaching

5.10.2 Programmes

A wide range of programmes offered in UB covers various disciplines needed for a developing economy. However several of the certificate and diploma programmes enrol very small numbers thereby bringing the viability and cost effectiveness of such programmes into question. Indeed some of the master's and doctoral programmes are in the same situation hence the need to closely analyse the data wherever these are concerned.

[30] It is important to note the level of involvement of the professors because it goes to shows the extent of involvement and engagement of professorial academic leadership in the institution hence quality enhancement of the institutional work.

5.10.3 Undergraduate programmes

Evidence from Facts and Figures documents shows that the undergraduate programmes are the main business of the university with the undergraduate student population of up to about 14 000. All undergraduate programmes are taught in UB and this makes UB primarily a teaching university. Hence special attention has to be put on the quality of teaching and programmes. Teaching workloads and quality assurance on these programmes make them a commodity of significant value. Therefore the existences of diploma, certificate and indeed degree programmes that have insignificant numbers of students bring to question the viability[31] of these programmes. The implementation of the programme review recommendation was also found to be important and was dealt with during interviews with the UB leadership, which will be discussed in chapter six.

5.10.4 PhD Students and Programmes

There are few students who have graduated in UB at this level. About 34 PhD students were still perusing their studies; therefore the focus was on the PhD students' distribution across the professorial cadre as a measure of efficiency. It was noted with concern that some professors were not supervising PhD students. As noted earlier PhD offering is relatively new to the UB.

5.11 Conclusion

The results of the KAM when used to benchmark the economy's performance against the rest of the world and the region showed key areas that need attention. The diagnostic results of KAM show that, regionally, when comparing the Botswana economy with Mauritius and South Africa, Botswana has significantly lower indices in tertiary education enrolments and gross secondary enrolments and has no patents registered. It is the lowest of the three countries in terms of computer access and internet users per 1000 people as well as in its human development index. A further comparison with the world averages shows that the professional and technical workers as a percentage of the labour force was significantly lower than the world average. These issues

[31] In this case it refers to the minimum number of students required to enroll in a programme (which has said to be 20 students and 5 for a course but varies with different faculties) for it to be cost efficient. This is being reviewed.

place UB and indeed the rest of tertiary education under significant pressure to deliver on some of the national human resource demands. It is therefore appropriate to consider the tertiary education and indeed the higher education outputs as public goods in this context. KAM scorecards results with regards to Botswana's position and readiness for a knowledge economy reflect that there are tertiary education demand pressures.

This chapter has used secondary data to take a snap short of past trends and this study has enabled a reflection and review on the UB situation. The evidence so far reveals that planning and resource allocation have been independent of the data sources thus they were not informed by the institutional data available. It was also evident that the ITS data was not up to standard because it seemed to miss out certain important inputs that produce real time data.

There are a number of issues that the secondary data has shown which need further discussion. Apart from having provided guidance on the expenditure levels it has shown that staff costs continued to increase and constituted 67% of the total budget in 2005/6 while operational costs accounted for 32%. This makes human resources an important input that should be focused on. The human resource input is discussed in conjunction with the products or outputs that it generates i.e. students, programmes and research outputs.

The evidence gathered shows that the goal of increasing access and participation is being gradually achieved because the enrolments rose by an overall of 18.6% from 2002/03 to 2005/06. However the increase in academic staff (including staff development fellows) for the same period was 5%. It can also be observed that the overall academic staff (including staff development fellows) as a proportion of student enrolled is 5.5%. It is further observed that as enrolments increase the government subversion has continued to decline which makes generation of income by UB an important issue to discuss. Notably it was found that there were 32 professors and 58 associate professors and 36 PhD students which issue is cause for concern especially where the research output is not significant. With 160 research projects recorded as on- going, only 8 of which are led by professors, the academic leadership perception was found to be of critical importance.

This chapter has established that UB uses an incremental budget system which uses line items that get adjusted for inflation. The system is therefore a form of negotiated or ad hoc budgeting system discussed in chapter three. This chapter has partly responded to the sub-question 2 and 3 of the research question of this study (objective 2 and 3) and has also responded to the research sub-question 4 (objective 4) in that it has identified the negotiated or ad hoc budget system as the resource allocation system in use at the UB. Literature has shown that ad hoc budget system is based on line items and the allocation and control of funds done centrally. There is therefore an element of rigidity in this system which is restrictive and may not support best practices that would lead to commodification of knowledge. It suggests that a sound and well maintained data base is critical pre-requisite for a formula based resource allocation model. It also finds that the data based and business processes have not been maintained to a competent standard to support resource allocation that would lead to commodification of knowledge.

The next chapter will solicit the views and perceptions of the UB leadership on the notion of commodification of knowledge. It further seeks to understand how the UB leadership plans to further align the UB's agenda with the national aspiration of becoming a knowledge based economy.

Chapter 6

6.0 UB leadership Impressions/Perceptions

This chapter present outcomes of interviews with UB leadership on matters affecting policy, plans and management of the university. This chapter discusses the views and the perceptions of the leadership of UB with regards to some of the strategic approaches designed to transform the UB to change its operation as well as position itself as a centre of excellence. The discussion starts off by looking at the priority areas and the reaction of the leadership to the phenomenon of commodification of knowledge. The chapter further interrogates the leadership's perceptions on matters of UB's contribution to the national aspiration of becoming a knowledge based economy. Above all it presents the views of the leadership on resource allocation.

6.1 Interviews on Matters of UB Data Sources

On the issues and needs of the knowledge economy the leadership was asked to respond to questions on how they have used the UB statistical data, needs assessment study, impact study, graduate appraisal reports and any other information data base to inform themselves and on how relevant such data was in their decision making process.

Evidence gathered shows that all the respondents engaged their faculties and centres to develop a faculty/centre strategic plan which align itself with the UB goals and they all made reference to the UB strategic goal document entitled Shaping Our Future. All the respondents admitted to having designed their plans along lines of serving the Botswana economy. Two institutional goals were addressed in the interviews within the broad areas of programming, resource allocation, funding and research. There was however a difference in the approaches adopted to address the two goals and in the way the different faculties understood and plan to deliver on them.

When asked whether data from facts and figures and other sources such as ITS is useful in their planning and if it reflected what was on the ground, all the respondents felt there was limited management information to inform decisions. In some instances the data source in UB was said not to reflect the situation on the ground and in some instances there was no information. These concerns of insufficient data were expressed during interviews by the respondents (except one) but more openly by the DCA when he said "The underlying problem here is there is no management information available in UB."

The D2 expressed concern that concepts such as Full Time Equivalent (FTE) have lost meaning in UB and that nobody is bothered or understands how they are worked out. The D3 faculty said

> For a long time our department of institutional planning was not working very well. I must say it was not there. So the things like staff/student ratios, FTE's they were done on an ad hoc they were not seriously informed by hard figures.

It is evident that the data resource at UB was not being used to plan or inform decisions. Moreover some of the respondents do not agree with some of the UB data source output because they indicate that most of the figures do not reflect what is on the ground.

6.2 Programmes

In his interview the DCB prefaced his responses by noting that UB is undergoing change and programme reviews are being undertaken through out the faculties of UB. Notwithstanding the intended UB wide programme review the D2 and D1 admit to have already undertaken the reviews.

All the respondents of faculties interviewed admitted they were engaged in programme reviews. The DR1 and the DCB saw the on-going review of programmes as a transformation phase for the institution towards a better and improved new beginning. The DCB sees the review of programmes as an opportunity to recast their activities and get ready to compete with the new university.

However on enquiring whether any people have been laid off, redeployed or made redundant after programme reviews, no one had experienced such after these exercises. Nonetheless the D2 had reservation which he shared and said

> ….. we do all these reviews but then what? …..I am not quite happy with the follow up in terms of implementing the recommendations. Some departments have been reviewed for more than one year and it is almost two years but they have not done anything, there is no visible change or movement that has been influenced by the reviews.

The D3 and D1 would not commit themselves on whether action had been taken or not following these exercises but agree they have done reviews. This leaves a situation of mixed views, that is whether reviews conducted by UB faculties and departments lead to redeployment, redundancy or been laid off.

All except one of those interviewed agree that UB should adopt an aggressive strategy towards establishing a strong PhD presence. They however differ on the form and direction that such a strategy should adopt in order to work well.

In responding to issues of post graduate programmes some respondents were of the view that PhD students should not pay tuition fees because they are a resource since they generate knowledge through their research. However they had reservations with regards to ways of getting the right personnel to supervise the students. One respondent suggested

> ….. unless you have high level personnel or highly qualified people with a PhD as senior lecturers at most to professorial, you will not be able to attract PhD students. You see PhD students are a very interesting group of people. They normally want to follow a professor in a field that they want to study. If you don't have those people here it is very difficult to attract PhD students.

One respondent argued that the fee demanded for PhD programmes is prohibitive and another was of the view that PhD students should not be asked to pay for their programme because they are an asset to the institution, as through the potential of their research they can be a source of

third stream revenue. Yet another dean thinks Botswana's market is not ready for PhD graduates and that the important qualification in the market is a master's degree.

Given that a teaching university's activity is centred on programmes, respondents were asked to shed light on what they are doing to improve their undergraduate programmes so as to be able to attract students. There were various views shared in this regard. One respondent said UB is attracting many students so it will always get the quota of students it wants because students will always want to come to UB. Others thought UB could not fill its quota because students had better offers for marketable degrees from other universities, while other think students who had offers from UB did not communicate their decision until it was too late for offers to be passed on to other candidates in the waiting list.

The respondents also claimed to have a fairly good idea of what goes on in classes, class sizes, teaching equipment and were generally very much in touch with what was happening in the teaching of their programmes.

6.3 Resource Allocation Drivers and the Budget System

All respondents admit that UB does not have a resource allocation model, and that this situation has resulted in inefficient use of resources, that UB does not have a staff allocation model and has no staff workload formula to guide its operations. Deans also confirm that they have to argue every case for budgets that depart from the norm or when there is need to do so. All the respondents had hopes that the resource allocations model will go a long way towards addressing the inefficiency of the current system. Although the respondents admit that the resource allocation is driven by strategic plans they do not seem to place emphasis on the convergence of the faculty plans to the institutional strategic plan. Some of the respondents thought the faculty plans tend not to be aligned to the institutional plan resulting in diverse and multi-focused plans. In many ways these overstretch the resources.

In seeking views and opinions on what should drive the resource allocation model the leadership firstly dismissed the incremental budgeting system in use as wasteful and inefficient. They do not see room for improvement in the system and declared that it needed to be replaced. Although

they have embraced the zero based budgeting system they only find that it is a transition system. They seem to have accepted the workload formula as being the ultimate determinant of resource allocation model. There are differences in perceptions with regard to the workload formula, staff allocation model and a resources allocation model. However the deans also admitted that resources are being wasted by investing on programmes that have not changed for a long time and the money could have been better used elsewhere. The D2 said

> Actually, we are wasting resources. We should be investing that money in areas where there would be able to participate or where there are chances and opportunities….

All respondents were able to report on the different staff workloads and acknowledge that there was some imbalance in the spread of work amongst lecturers. They nonetheless had no scientific way of capturing appropriate data except using the subject specialisation of individual lecturers and sharing work in terms of number of classes.

6.4 Funding

On the issue of third stream income the DR2 shared the information that revenue generated by UB through other means is set aside and declared to government at the end of the financial year. The government expenditure policy requires UB to first expend the revenues it generated before it expends revenues newly allocated to the university in any given budget/financial year. This is yet another cause for concern; the fact that the revenues generated by the university are not entirely controlled by the institution but are subjected to government policy regulatory controls does not sit well with the UB leadership.

Sentiments expressed by all the respondents regarding generating third stream funds in UB were that there is no incentive to do it because revenues generated result in reduced funding by government. The D3 made it clear that

> This way they don't encourage people to work hard to generate more money for the institution. The more money you generate the less you get from the government. That is a disincentive….

The pressure that comes with the budgeting and the resource allocation process at UB is evident from these comments and therefore addressing these will go a long way to promote and facilitate efficiency.

The interview with the DCA generated strong views especially as the head of the finance and human resource when he said

> You can't talk of resource allocation model if you don't have management information available. Second problem is the way that we are getting funded. We are screaming with a golden spoon in the hand. We are being funded at this stage like no other university that I know of in the world but what are we doing? Nothing

DCA's view is that UB is generously funded and this is indicative of the state of funding, its inefficiency and ineffectiveness. He also makes a very critical observation that UB does not have a strategic fund and therefore does not have room for flexibility in the event that there is need for a strategic move. Therefore overall, all respondents admit that government has generously funded the UB.

6.5 Research

When turning to research activities all the deans interviewed did not know what research activities were being undertaken in their faculty because someone else had been assigned that responsibility to oversee this activity; but one of the respondents had a record of publications of his faculty. Generally the deans seemed to have annual records of completed research activities although they did not know what their staff was doing on research. In responding to how they monitor research activities one of the deans said he is able to tell the involvement of staff in research activity by the speed at which the conference funds vote gets depleted.

When focusing on staff publications it was evident that there were a lot of publications by all the faculties. The status of research activity gets reported at the end of the year and these would be output in the form of publications. D3 however made the following observation

> …this is why I gave you this book just to show what I have been doing from 2000 to 2005 ..... We are doing research we are … in international journals and everything but beyond just generation of information have we translated that into products and services that can be used by people out there. That is the big challenge.

Apart from the normal recognition of individual people's works and intellectual property the evidence shows that no research outcomes have been patented yet. A policy on Intellectual Property (IP) has recently been approved and it is hoped it will provide the necessary impetus for identifying, protecting, guiding and registering of intellectual property rights.

The DR1 admits to finding it difficult to monitor and coordinate research activities in the faculties because some departments and faculties conduct research that goes unrecorded, especially those not funded by UB or by its partners. Some faculties which access other sources of research funding only get to report their research activity at the end of the year. Therefore, a true picture of what is going on in faculties is not quite known until reported at the end of the year. This makes coordination of and decision making about research difficult.

The DCA, when expressing his concern on research issues, said "I just pray that the new funding framework for higher education in Botswana will reward the research output…. " This statement may be considered to be an acknowledgement that the current reward system is not attractive especially towards research activities.

6.6 Increasing Access and Participation

The respondents did not differentiate increasing access and participation. They understood it to mean essentially the same thing. That is, if numbers of students are increased, and access UB programmes on offer, students will have the opportunity to participate in learning and pursue the degree programmes on offer. However the understanding of this concept and the implementation plans seemed to differ. The D2 openly admitted that he does not make a difference between access and participation and further said,

> In our strategic plan we have identified …… opportunity areas of growth that's where we target to increase access…..if you talk of increasing access you have to identify areas where you are going to increase access.

He acknowledged that there are areas that have to be cut down. He further made reference to a national study of teacher supply and demand which is being undertaken and that he is a member of the reference group. He also identified early childhood development as a critical development area in which they are planning to undertake action under the coming NDP 10. His faculty together with the government is also planning to conduct a needs analysis on it.

The D1 acknowledged that increasing access is taking place in his faculty and hence increasing participation and said that;

> Access means ability to come in and one would hope that once they come in they participate …….when they decided on the objectives of shaping our future they correctly considered business education as one of the most important in the country therefore the percentage of students that would come to FOB is being increased significantly…. the Faculty of Business will be one of the largest …….. in the entire shape of the university. In fact you are talking of about close to 30% of students being in the faculty so the increase in student numbers the majority will be in the faculty of business……..

The Faculty of Science, as part of their increasing access and participation, find themselves having to participate at secondary education level to encourage the learning of science and science related courses so as to have increased numbers of school leaving students applying for science courses at UB. Once again these are efforts geared towards increasing and creating an interest in studying science with the hope of increasing an expanded pool of students applying for science programmes, hence increasing access. They also considered increasing access as being the same as increasing participation.

6.7 Engagement and Entrepreneurship

The understanding on this goal is varied in that while the faculty of education sees engagement and academic pursuits as central to its engagement process it is less interested in matters of

generating income but more interested in the direction of serving the national needs. To this end the D2 said;

> But for us the thing is not the money but the interaction between us and our stakeholder that is very important not the money as such…….enterprising is important but ……. you know of course that academic institutions are under pressure to raise funds but first and foremost really for us what is important is to get that engagement because it helps you become relevant.

Notably the issue of relevance is very important and in the final analysis it connects well with the idea of servicing the nation and is also in line with the UB mission statement.

The D1 and D3 on the other hand believe they have to engage with the corporate world with a view to forming partnerships that will generate wealth or income for the institution. They also aspire to become a big part of the recently established innovation hub/centre of Botswana. The D1 said

> …..we do have a unit that assist us to engage with society that is, the business clinic mainly to assist people who wish to go into business apart from that to give general business training to the community. In as far as academic entrepreneurship is concerned we have also tied in what we called the academic executive development programmes as we also do entrepreneurship development programmes all these are being handled by the business clinic. Because we visualize this as a major task we have decided to transform the business clinic into a centre which will be called the entrepreneurship development centre and it will be a larger centre that will enable us to engage more effectively to practice this academic entrepreneurship.

The faculty of science has established relations with the Botswana Meat Commission (BMC), Botswana Bureau of Standards (BBS) and Debswana to conduct projects on several biological issues of interest and of benefit to the industry.

It is important to recognise that the perception of different disciplines depends on how they treat the cost associated with funding their operations. The way priority areas and strategic goals are treated and the way economic returns accruing to business operations of the faculty is directly

related to the perception upheld by the faculty leadership. The social responsibility aspect of university operations over-shadows the economic benefits of engagement. In one way engagement with external stakeholders could lead to entrepreneurship but it is the social responsibility that stands out more. To this end it is the notion of cost recovery and or breakeven that supersedes all that is planned.

The issue is whether the perceptions in the three faculties will converge towards a common goal. It would seem that while other faculties aim at generating revenue from their outputs others may equally expend revenues towards enhancing the social responsibility of the university. It can be observed therefore that the rewards accruing from commodification of knowledge outputs, if expended on social responsibilities of the institution social value may effectively became manifested in threats to the notion of commodification of knowledge; hence the need for a resource allocation model accompanied by a mandate to make profit. Because UB was founded on the notion of being a non profit organisation it is proving to be difficult to openly engage in profit making activities.

6.8 Commodification of Knowledge and Knowledge Economy

Although there was a general understanding on the definition of commodification of knowledge it was evident that the respondents did not find it readily explainable. The respondents were asked to talk of the support that is needed to address commodification of knowledge and needs of a knowledge based economy. They were asked to interpret, make observations and make a linkage between the statistical data at UB and the reality on the ground. The D2 said

> I think those concepts are all there, FTEs in UB have lost meaning…. No body is bothering to; no body understands how those things are worked. Because you see if we talk … about all these concepts, when UB has no staffing model…..these figures again they don't mean much because you see you are aggregating and getting an average but now when you start interrogating them you find that there are people who are overwhelmed.

The D3 shared similar sentiments that the statistical data have not been used to guide decisions and therefore decisions were made using other criteria which has not been efficient but rather a waste of resources. He continued to say,

> For a long time our department of institutional planning was not working very well. I must say it was not there. So the things like staff/student ratios, FTE's they were done on an ad hoc they were not seriously informed by hard figures. It was more of estimations. I want to say that in itself was not good planning….

All respondents in faculties and centres had misgivings about the statistical data except for the D1 whose view is that the statistical data at UB reflects correct and accurate information.

The other supporting factor for commodification of knowledge would have come from staff turn-over ratios. Although not provided in the statistical data the respondents all indicated that they have a very low staff turnover but find it very difficult to recruit experienced and highly qualified staff, especially in science programmes, because the salaries are not competitive.

The reasons for resignations and non-renewal of contracts were varied and found to be reasonable. The resignation of local staff to join industry was seen as worrisome and a loss to the institution because resignation of local staff members happens after the institutions have expended on training people up to PhD level. This was, however, not found to be a loss to the nation by one of the respondents because people who resign join industry in Botswana and therefore they serve the nation.

To address how UB embraces commodification of knowledge the respondents were asked to share their views with regards to quality standards of the outputs of their faculty especially in programmes and research output. All respondents of faculties and centres admitted to being involved in the process of programme reviews which have not been completed by some of their departments, although some of their departments had completed the exercise some were still to report. This was not the first review of academic programmes; the older faculty members had carried out reviews before. D2 had the following experiences to share when asked of the impact of the reviews. The D2 said,

> ……my feeling is that we do all these reviews but then what? Then I am not quite happy with the follow up in terms of implementing the recommendations. Some departments have

been reviewed for more than one year and it's almost two years but they have not done anything, there is no visible change or movement that has been influenced by the reviews.

The D3 has embarked on what he calls re-shaping the faculty of science and said,

> …what I am driving at is that the programmes that UB is offering have been overtaken by events,….. Students …. want to do quality surveying they would like to do nutrition, medicine unless we come up with something that is more exciting…. I think we have to come to that the whole purpose... But you see I cannot do it alone whatever one comes up with it has to have the support of the executive management. If we don't get support from the higher office then it is a futile exercise.

In commenting on institutional outputs and linkages to the economy the respondents were all convinced that the undergraduate output from UB was relevant and addressed the needs of the nation. However they also acknowledged the need to improve and change a number of things that are making UB programmes less appealing to potential students. The D2 said "yes our programmes should try to mix so that they appeal beyond the borders so that people can become marketable but it is complex and it changes every day".

He would like to see a regional qualifications framework that will align qualifications of different teaching professions and hopes this will improve the mobility of teachers across the region. D3 said

> I have challenged the faculty executive and said, look we have been formed the way we are for more than 30 years. Is this the best model to deliver science in the 21st century? You see how people are beginning to interrogate themselves because of the way we are structured and the way we are formed we might be overtaken by events. Unless we deliberately talk about things and come to a consensus, after benchmarking around the world we might be stagnant and stagnation can come up with all kinds of problems. It means that we might not even grow we might not even be relevant or current.

6.9 Conclusion/Summary

The data collected from interviews represent the UB leadership opinions and perceptions of leadership at the UB. The leadership's understanding of commodification of knowledge and their

interpretation of increasing access and participation; as well as their understanding of engagement and entrepreneurship goal were explored.

There were misgivings about the use of statistical data and management information in planning and budgeting. Respondents agreed that the incremental budgeting system that has been serving the UB is now obsolete and should be discontinued. They also agreed that there has been a waste of resources that should not be allowed to continue.

The UB leadership was therefore asked to react and give their views on issues relating to the use of data and management information in the planning and allocation of resources at UB. It was evident from their responses that statistical data is not perceived to be key to resource allocation and budgeting at UB.

In this chapter the perceptions of the UB leadership were found to be anchored in the university's strategic plan but vary on implementation agendas. Although the respondents talked of changes, plans and what needs to be done they effectively are referring to a transformation process. While it is evident that the focus in UB is on transformation of the institution it is also evident that there is a variety of ideas on how individual faculties handle the transformation process.

It is evident that access and participation is seen as meaning the same thing and therefore increasing the number of students enrolled will achieve this goal. Engagement and entrepreneurship have different meanings for the respondents, where some see the engagement with stakeholders being more important and others find that making their output relevant to the market will enable them not only to generate revenue but to engage the community they serve.

Deans who were interviewed agreed that some of their programmes have been overtaken by time and events and need redesigning but new ones should continue to be guided by needs assessment studies in order to make the graduate output relevant to the market. None of the deans talked of impact assessment, graduate appraisal and other follow up studies that appraise graduates and market performance.

It is evident however that the deans interviewed are not truly in touch with the research activities of their faculty although they get reports at the end of the year on publications and completed outputs. There is acknowledgement that some of these generate lots of information that does not necessarily translate into products and services that can be used by people in industry.

The next chapter deals with documentary evidence and interview data analysis. It will triangulate the evidence gathered and look at the likely influences that these perceptions and views may exert to the commodification of knowledge. It will also measure these against the national data and the use of KAM will facilitate the assessment of the nations performance and bring to the fore the challenges faced by HE.

Chapter 7

7.0 Data Analysis and Findings

In this chapter secondary data (documentary evidence) and primary data (interviews) are put together with a view to drawing conclusions. It also links the findings to the research sub-questions and ultimately responds to the research question. Finally this chapter will triangulate evidence from UB data sources, TEC and views and impressions from the UB leadership. The outcome of the analysis forms the findings on which subsequent recommendations are based.

7.1 Data Analysis

7.1.1 Institutional Data Resource Analysis

The rationale to analyse the data source in UB is made necessary by the direct relationship that data has in the measurement of the efficiency of inputs in the resource allocation process. As noted in chapter five staff costs constitute the largest share of UB's budget and that makes human resource input a very important resource to monitor, control and measure. It becomes equally important to evaluate and reflect on the output generated by human resource in terms of its relevance, quality and quantity. It is important therefore to reflect on the relationship between staff and students as shown by the staff/student ratios, completion and transition rates. Its also make sense to reflect on the staff/research output levels.

In order to appreciate the evidence gathered the data analysis was conducted using the following key areas; the review of programmes; the availability of data bases/sources; resource allocation as a mechanism of efficiency/effectiveness and intellectual outputs (teaching and research outputs).

7.1.2 Analysis of Institutional Statistical Data Resources

The students enrolled in the Faculty of Business more than doubled in 2004/05 while a further 8% increase is registered in the subsequent year (Table 9 page 85). The faculty increased its staff by 4.9% and received no additional staff in the subsequent year (Table 12 page 87). A closer look at the Faculty of Engineering & Technology (FET) shows that it continued to experience a student enrolment decline and yet continued to experience an increase in faculty staff establishment (FTE). Although the Faculty of Science has on average maintained a constant percentage growth in student enrolment it has also experienced an increase in faculty staff establishment (FTE). This brings to the fore the issue of staff workloads.

The use of student/lecturer ratios becomes very important when we look at staff workloads. It is not clear what average ratios mean, whether it is an average of lecturers in post divided by student FTE or full time head count of students; it is not clear if the FTE calculation included lecturers on study leave, part time lecturers and others. However work distribution will still remain a challenge until workloads can be calculated and a database made available. This information becomes important when we look at priorities that UB has to embark on.

The observation that can be made from the data is that the decrease in the numbers of professors is accompanied by significantly higher increase in the associate professorial cadre (Table 11). Further the numbers of post graduate students' enrolment for both masters and PhDs increased (Table 8), notably supervision of post graduate students rests with professors, associate professors and doctoral staff. Faculty of Engineering Technology enjoyed an increase of 16.2% (Table 12) on academic staff establishment in the year 2004/05 which was accompanied by a 13.4% decrease in students enrolled (Table 9). Could this imply a reduction in workloads?

The School of Graduate Studies has no FTE staff establishment and therefore by implication it must be receiving service from the faculties across UB. Meanwhile CCE does not seem to have academic staff yet it offers part time undergraduate programmes. This has implication for workloads of staff that teach CCE programmes. CCE engages the services of a significant number of part time lecturers which do not seem to be reflected in the data. The above issues make it difficult to interpret the statistics and to make sense out of it.

The student drop out or retention rates have not been recorded and these then affect the meaningful use of completion rates. These anomalies bring to question the efficiency and adequacy of the data resource. If the accuracy of data is brought into question there is reason to question the ratios and the situation on the ground and therefore data resources need to be looked into in depth.

A number of possible inefficiencies are also detected from the UB data source in particular the staff/student numbers especially when using the professorial and associate professorial cadre. UB records show that it has 34 Doctoral students and 32 professors and 58 associate professors. It is noted that professors decreased from 39 to 32 and associate professors decreased from 58 to 46 and climbed back to 58 during 2002/03 – 2005/06 period. In using the graduate doctoral student population and professorial posts as a measure of efficient resource utilisation there is evidence of underutilisation or a mismatch of resource use.

Overall there are problems associated with the absence of the FTE's computation in general, the lack of transition rates, completion rates and success rates. This is a major problem because the efficiency of a resource allocation model is embedded in the staff work loads whose performance is measured by using the above indicators. On the other hand the FTE's are key determinants of the systems efficiency level hence incorrect assumption and inaccurate computations may result in serious errors of judgment and decisions leading to undesirable outcomes. Although evidence from the UB leadership reflects they are concerned with the lack of adequate management information it is also evident that the data resource is not well computed and has not been used in budgeting and allocating the resources.

7.1.3 Analysis- Programmes

Reviewing programmes and courses in the faculty and departments has the potential to significantly impact on the resource allocation system and translate into increased efficiency in the utilisation of staff. This would be possible if the outcomes of the reviews are used to tie the process to the development of a workload formulae and the resource allocations model. The respondents interviewed indicate that they are conducting programme or course reviews and thus

see it as an important exercise. It is evident that the faculties have not completed conducting programme or course reviews. At this point it is critical to also recognise that there is a chance that certain programmes and courses are potentially wasting recourses. While individual faculties attempt to review programmes and courses one wonders about the impact that these reviews will bring to the resource allocations model development especially because of issues associated with failure to act on recommendations coming from reviews.

Programme reviews are a very important exercise but amongst those interviewed some respondents think the outcomes of reviews are not effected and thus make the review exercise a waste of time and resources. It is also evident that the deans interviewed were more aware of teaching activities than research. They did not know real time research activities being undertaken by staff and would have to call the person in charge of faculty research activities to update them.

The documentary evidence did not find needs assessments for some of the programmes and in many instances there has been no follow up studies such as impact assessment studies or graduate appraisal studies for a very long time. This implies that the institution has not been responding to changes in the market, if there have been any, and thus it has not been using scientific practices to take decisions on the viability of its programme. The faculty leadership interviewed confirmed this position for some of the programmes.

The data collected from UB leadership brought forth a number of differing opinions and perceptions with regard to the PhD programmes and programme reviews at undergraduate level. There is no one correct perception but approaching things from the point of what needs to be done could yield a positive outcome. One finds that while it may be true that the students may find the cost of a PhD prohibitive it is expected that students should source funding from international, national and any other organisations for support.

The issue is whether the potential students are knowledgeable and motivated enough to present a proposal that industry, business and academics would be interested to finance. This constitutes a study of its own. Meanwhile the evidence from interviews also shows that there are those who believe PhD students follow professors in specific fields and therefore choose to pursue the

subject area of a professor in question. Therefore, employing renowned professors in varied key fields of study would attract PhD students. Whether this is correct constitutes yet another topic of research; however, one needs to look at what the roles of academics are in UB.

The role and works of the professors and indeed the academics in general at UB revolve and hinge around knowledge generation. The knowledge output from UB is the one that sells the institution and knowledge output makes professors. It takes time and money to develop a professor and therefore it is equally important to keep one. The idea of attracting professors is important if we consider the issue of relevance. However, are academics in UB publishing and researching in subject areas that put the institution on the world map and thereby attract international audience, attention and students? Is knowledge being researched and published that is captivating and relevant to the society? Is such knowledge integrated into the teaching curricula? The D3 acknowledges that some programmes in UB have been overtaken by events and feels UB has do something to introduce attractive programmes.

The D2 had a very firm position that the economy of Botswana is not ready for PhD graduates but rather the master's programmes are more important. Perhaps the issue is whether producing PhD graduates as a potential strategy would catapult UB into a new market and whether there would be adequate candidacy from the region should be a matter of market survey. It would seem there is tension on what strategic direction needs to be taken.

Overall, there is need for programme reviews to be conducted and most importantly the consideration of recommendations should be discussed and, shared with industry for its input before being implemented. A market survey on postgraduate programmes should be conducted for UB to inform its strategy on these programmes.

There is an inevitable need for UB to undertake comprehensive audits/reviews for its programmes and courses with a view to make UB programmes become programmes of choice.

7.1.4 Analysis - Funding and Resource Allocation

Notwithstanding some of the above shortfalls within the UB system, the government has been generously funding UB but the efficiency of utilisation of the resources is being questioned. The DCA and others respondents acknowledged this as a fact. Statistical data evidence shows that two thirds of the budgeted funds go towards human resource payments; this makes it very imperative for the institution to ensure human resource efficiency is addressed and improve on productivity levels. If UB expends two thirds of its funds on paying for human resources and for it to yield a good return on its investment then the productivity levels of human resource output should be high. It is therefore important to discuss very carefully the monitoring and managing of the input or human resource in this case that accounts for the highest share of the budget. Related to this matter is the issue of the efficiency of resource allocation.

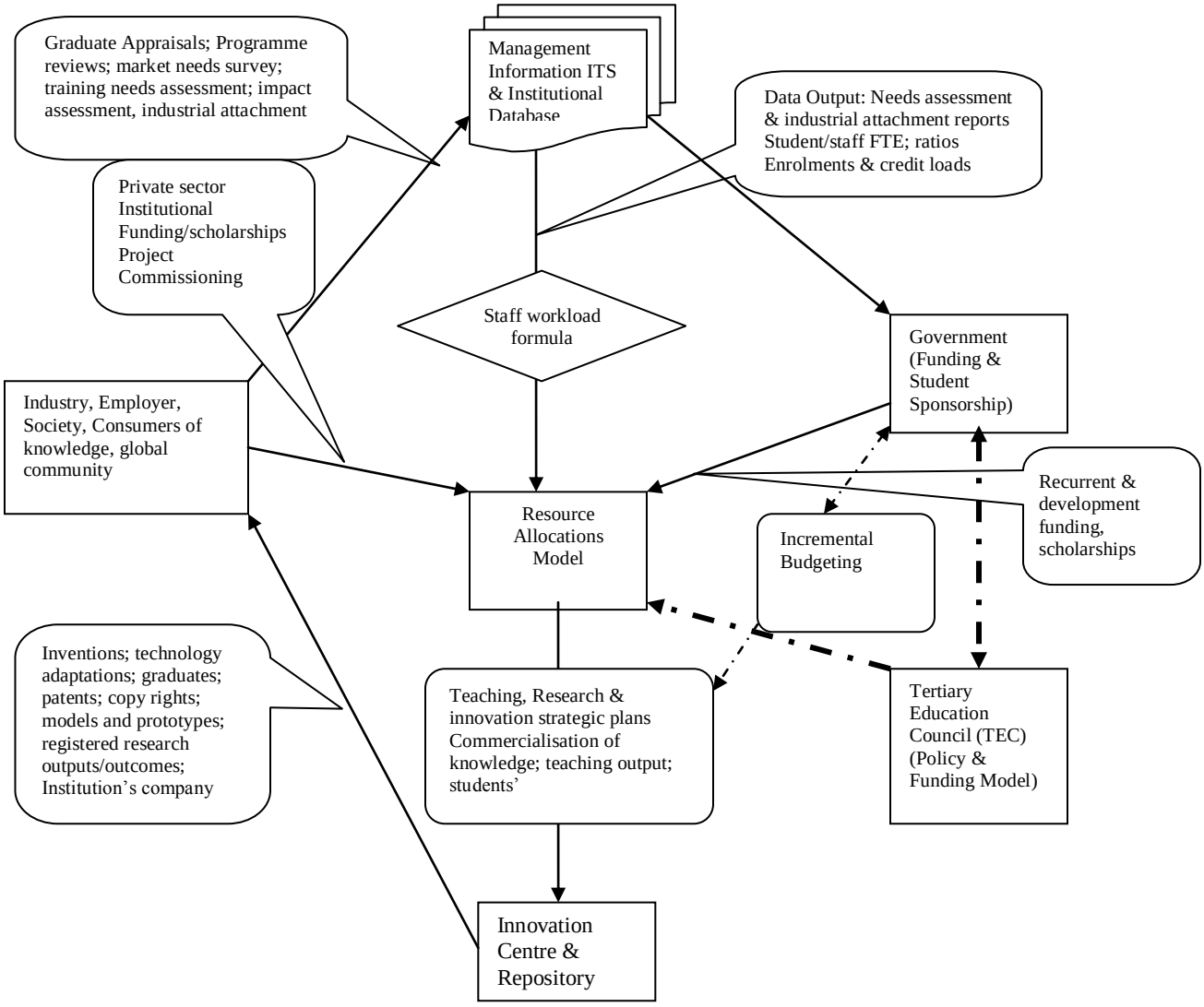
Evidence gathered shows that UB uses an incremental budgets system to allocate resources. The resource allocation is conducted through a consultative budgeting process (negotiated budget) that involves a number of committees from departmental to faculty and eventually ending with the Planning and Resource Committee (PRC). This system has been found to be inefficient in that it does not take into account necessary market changes and does not use statistical data to guide the direction of spending. All respondents interviewed confirmed that the system is not providing the best results and is therefore deemed not to be efficiently working.

7.1.5 Analysis of the Systems

The adequacy of the institutional data collection system, the funding and resource allocation system and programme review system have been found to require significant improvement. The following flow chart maps out the perceived systemic management information and input-output flow. Many of the inflows lead to the resource allocations model which in turn produces knowledge outputs followed by a flow of inputs between three key players; the government, the student and industry. It is important to recognise the role of the inter-mediatory players. Notably the Tertiary Education Council, whose function is influential in the universities decision making processes.

Figure 7.1 traces the operational, financial and management information flow which is based on the observations made during data collected. The skeletal flow chart shows my perception on how different processes link up and how these are expected to feed and facilitate the next stage.

Figure: 7.1 Financial and Management Input/Output Flow Chat



The solid straight lines show the direction of the flow of funds and the input and output flows. The boxes show stations in which data is processed and decisions are taken. The dotted lines indicate influential linkages that impact on the funding system and the bold dotted lines are the likely intervention by the TEC's funding model. Therefore the line that passes through the Incremental Budget is considered to be that of processes that are inefficient and ineffective since the respondents have indicated that the system is not effective. In the current set up it is not clear what relationship exists between the management information systems, ITS and institutional database and the industry/employer. There is no staff workload formula and no resource allocations model.

Overall the dotes thin line in the input/output flow chat shows the weak links between government funding and incremental budgeting and university activities. It is expected that in the near future there will be a linkage (shown in bold doted lines) between the Tertiary Education Council, government and UB's resource allocation which is expected to come through tertiary education policy and the funding model. The connection between government funding and resource allocation will depend on the funding model yet to be tabled. The role of the private stakeholders is a significant link that should be at the forefront of the university operations. Stakeholders receive products in the form of university output and feeds back information on the performance and adequacy of the output. Stakeholders also directly contribute to the resources allocations model through business operations and funding students and projects. This linkage is still being nurtured in UB and needs to be strengthened.

In the final analysis with the help of the above diagram one wants to trace the salient points in the discussion above. Management Information, ITS, and other forms of data source are critical decision making tools that have the potential to make or break the effectiveness of the management decisions. Our case revolves around the resource allocations model and how it supports and controls the operations of the university towards commodification of university outputs. Evidence shows that there is no staff workload formula and there is no resource allocation model. Further-more the data source is inadequate for purposes of efficient resource allocation. In place of the resource allocation model there is the incremental budget system which admittedly is found to fall far short of being efficient and effective. Because incremental budgeting does not rely on real time data the system makes inappropriate allocations based on the historical expenditure.

Although some of the components of the system exists in the current establishment it is evident from the argument presented that the system breaks down because key stations such as resource allocation model and staff workload formula do not exists. Therefore the link between stakeholders is ad hoc, sometimes leading to decision making resulting in appropriate resource allocation and resource wastage.

7. 2 Overall Findings

In checking what commodification of knowledge was understood to mean and how it was being addressed two priority areas were used. The UB leadership was asked specifically to make observations on two of the priority areas that UB is pursuing, which is the engagement and entrepreneurship goal and the widening access and participation goal, with a view to linking them up with the commodification of knowledge. They were further asked to indicate whether they had strategic plans which embrace the two priority areas. They were also asked to make observations on the UB database and its usefulness towards resource allocation. In addition to asking them to comment on the role played by their faculty in knowledge commodification they were asked to comment on the resource allocation model of UB and research activities of their faculty.

To a large extent the above would have defined the commodification of knowledge or de-commodification of knowledge status at UB. The findings show that the concept of commodification was not uniformly understood to carry the same meaning across faculties. This has implications for the strategic plans of different faculties and institutional centres.

In order to respond to the issue of whether UB embraces commodification of knowledge, an enquiry was made on several issues regarding the use of statistical data resources, the ITS and programme review activities. The findings reflect the following situation at UB.

7.2.1 Institutional Data Resources

The UB Facts and Figures statistical data resource and the Integrated Tertiary Software (ITS) data source have been the key statistical data base used but were found to fall short in many respects mainly to do with data input processes and variables in data computation. For example the Centre for Continuing Education and graduate studies school do not seem to have academic staff although they are shown as having students enrolled in their programmes. This should affect the students FTE as well as the lecturers' workloads and raises questions on the staff/student ratios. It is not clear whether the staff FTEs include part time lecturers, teaching assistants, temporary full time lecturing staff and staff on training or whether the students FTE is arrived at by head count or proportionate calculation.

Secondly it is not clear how the ratios are reached, that is whether careful consideration was given to interdisciplinary courses that are often oversubscribed. It is also not clear whether the ratios were reached through using the faculty staff establishment register or head count that included part time lecturers, teaching assistants, temporary full time lecturing staff and whether staff on training were factored in the process. The above raises a number of issues that affect the budgetary processes. The uncertainty with regards to the staff FTE's and students FTE's makes it difficult to rely on the accuracy of these figures. In the absence of the transition rates, completion rates, drop out rates and success rates the adequacy of the data resource is brought into question.

All the participants agreed that their new programmes were motivated by a needs assessment study as required by the university. It was found that the needs assessment approach has led UB to attempt to address the diverse business and social needs of society as presented by the different faculties. This in turn has overstretched the resources, especially because of the rigidity inherent in the incremental budget system. The DCA made this observation when he made reference to the non-existence of a strategic fund and therefore does not have room for flexibility in the event there is need for a strategic move.

It is not clear from the data presented whether the intended targets of the student enrolment plan (2003/4-2008/9) have been met, revised or are yet to be achieved. The deans clearly do not agree

with some of the UB data source output because they indicate that most of the figures do not reflect what is on the ground.

There was evidence of a limited real time data base which stems from the non existence of a real time data input system for students and staff. This stifles an informed and accurate decision making process. It was hoped that the ITS would help in this respect. The students' transition rates from one level to the next have not been reflected nor are the drop-out rates. Therefore it is difficult to determine completion rates and the time taken for a graduate to complete the programme.

It was found that the UB needed a more robust system for its statistical data collection to support the intended staff workload formula and resource allocation model. Several weaknesses were found to exist in the current system of statistical data collection, input and presentation. These weaknesses led to loss of confidence by staff to use it for planning. The lack of management information was found to be a significant constraint in many planning processes.

The findings show that although the statistical resource has weaknesses, certain key reference points had been set to provide guidance; these included the UB's strategic plan which had the vision and mission that articulated to the national long term plan, Vision 2016. The departmental plans had been drawn up and together they constituted faculty plans which in turn articulate to the institutional strategic plan.

7.2.2 Integrated Tertiary Software (ITS) Data Resource

Although the ITS data system has a number of good packages for institutional data the UB did not, for example, acquire the distance learning module. Evidently a number of processes for capturing information have been missed out. Since some of the institutional business processes have not been well defined, it is difficult to know the kind of data to be captured. For this reason the service providers may not have configured appropriate instruments to capture and link data in the collection process. Therefore the ITS remains limited in its use because as a database system it lacks the necessary links between human resource and student data; it captures historical data and misses the real time links. This can be translated to mean that the data collected through ITS

has no bearing on the budgets and real time decision making, a situation that impacts negatively on the efficiency of resource allocation. It can be agued that the usefulness of the ITS data is embedded in its ability to facilitate and connect the cost centres with faculty objectives, which is not the case in UB. Therefore the inadequacy of data impacts negatively in the allocations system, making it inefficient.

7.2.3 Programme Reviews

The DCB has confirmed that there is a university wide programme review process which it is hoped will provide some indication of the status of programmes in UB. Internal programme reviews are on-going and are being conducted by some faculties who think they need them. In some instances the review is conducted by external academic persons when it is due. Such a reviewer would tend to give an academic perspective of the programme. The involvement of industry has not been practiced although advisory boards in some instances do provide input. It is noted that the implementation of resolutions resulting from findings of these reviews is more likely to focus on programme content and not its implications for resources. Effective reviews in my view should involve industry, professionals and higher education managers. Therefore reviewing programmes with a strong presence of leaders of industry and professional associations would help UB design programmes that are market orientated. Although there is evidence that programme reviews are conducted there is very little to suggest that there are studies such as impact assessment studies, graduate market appraisal and others that inform as well as support programme reviews.

Evidence shows that individual faculties have conducted internal reviews of programmes and courses in the past but the results have remained at departmental levels, which had little impact. Faculty deans claim that they are concerned with the quality of programmes and the programmes/course reviews are conducted to identify and establish weaknesses in programmes and courses. The D2 expressed that it is rather frustrating that many of the recommendations of the reviews do not seem to be implemented.

7.3 The Intellectual Outputs (Teaching and Research Outputs)

Evidence from UB Facts and Figures statistical book for 2002-2006 indicates significant numbers of graduate graduating from UB in a variety of undergraduate and masters degrees and very few PhD graduates. There is no evidence of the transition rates from one level to the other, no recorded completion rates, success rates, drop out rates and other such measures. It was therefore difficult to determine how long it takes for students to complete their programme.

There are neither patents nor copy rights registered under UB. The Office of Research and Development (ORD) records show about 160 on-going research projects in the UB out of which 8 are led by professors. There is likelihood that there is more research activity going on in UB but this has generally been poorly coordinated. None of the faculty deans could talk specifically about research activity in their departments except for reported data at the end of the period. The ORD is therefore not informed of the on-going faculty research activity until the end-of-year reports are submitted. There is the issue of relevance whereof it is not clear whether research should follow the interest of individuals or the institutionally designed agenda. Drawing on the comments made by one of the faculty dean's that by not securing funding from ORD it does not mean that research is not being done; and further noting earlier observations made that deans were not truly in touch with what research was on going in the faculty, these say a lot about the way research is handled and the value attached to it.

More importantly the D3 also made the observation that there is a lot of published information from the UB but it has not translated into products and services that can be used in the market. This therefore brings to question the quality and relevance of research. These assertions should be seen in light of the regional and world performance indicators reflected in the KAM diagnosis.

7.4 Resource Allocation

The evidence gathered from the UB leadership confirms that the UB does not have a resource allocation model but has used incremental budget systems. This budgeting system uses a consultative budgeting process which is based on historical line items or previous year's figures

that get adjusted for inflation. Although the relationship between the institutional data source and the budgeting process seems not to significantly influence the process, the changes in the students' enrolments and staff employed are generally addressed as and when need arises.

There are plans to introduce a zero based budget system which is yet to be tried; it is nonetheless a budgeting system which will still take on inefficiencies that are inherent in the data sources. The evidence gathered shows that the alignment of costs and the strategic plans is limited, if not altogether lacking. Although priority areas have been identified the prioritisation of goals seems to differ from one faculty to another. The divergent perceptions noted on the UB's engagements and entrepreneurship goal means faculties would be developing varied strategic plans unless they meet to converge and align them. While it would be important and interesting to see these converge to UB's common goals without overstretching resources, it is unlikely that this can be achieved without restructuring and reshaping the departments. All the participants who were interviewed admit that the incremental budget system is not an efficient way to allocate resource and in fact they observe that it has been wasteful.

It was evident that the incremental budget system was considered to be outdated, inadequate and inefficient to serve as a resource allocation model. Therefore it was found not to support the needs of an institution that seeks to serve a knowledge based economy. The UB has already taken steps to design a resource allocation model to replace the current system. It was found that the UB has embarked on designing a staff workload formula that would in turn distribute work and support the resource allocation system intended for the UB.

The evidence collected indicates that the resource allocation system being used at UB does not seem to use the key resource input data in order to determine appropriate proportion to be apportioned to a cost centre. Beyond the figures used in the analysis the leadership provided the voice of reason embedded in policy and perceptions of UB leaders which was explored in chapter six. It also provided the broader understanding of the UB's priority areas identified earlier.

Since there is no resource allocation model at UB and the incremental budgeting system was rendered inadequate and inefficient to address the needs of the university and the economy by

default, it was evident that the current resource allocating system does not support commodification of knowledge and resource allocation is inefficient. It is the finding of this study that the necessary parameters for commodification of knowledge have been drawn in the form of the institutional strategic plan and institutional research strategy, beyond these the staff workload formula and resource allocations model are in the making. The worrying matter is that of the creation of an institutional statistical data base and management information system. It was evident that there is no real time data and management information to rely on for operations and decision making.

7.5 Conclusion

It is evident that a number of enablers have been put in place in the form of policy instruments and strategic plans. It is too early for one to make judgements on successes or failures of the efforts being made. However it there is evident that deans are not happy with the adequacy of the available statistical data and do not seem to use it in planning. In any event the resource allocation system in place is an incremental budget that only adjusts its calculation on past line item figures and ceilings set by government.

The document survey revealed three areas of importance that would facilitate efficiency and effectiveness at the UB, thus a) availability of accurate, reliable and adequate institutional data, b) efficiency of resource allocation, c) relevance of knowledge output and research. Although these are not the only important factors they were identified as instrumental in commodification of knowledge and its realisation at UB.

If the UB sources are to impact positively on university education and knowledge production then Programme reviews, graduate appraisals and market needs should inform the database of the institution. These should also be conducted on regular intervals of three or four years, this way the database is close to real time conditions and keeps the institution abreast with market changes.

The growth pattern of student enrolment has continued to increase until 2004/05 although it is rather stable throughout 2004-2006; the government subvention in the meantime has decreased

its contribution towards recurrent expenditure. Without the completions rates, retention rates, transition rates, market relevance studies, impact studies, graduate appraisal, research outputs and such other input data productivity levels of academic inputs it will remain elusive and abstract. In the findings that follow in the next chapter the thesis focuses on addressing issues that respond to the four areas of the research.

Chapter 8

8.0 Summary Findings, Conclusion and Recommendation

This chapter presents the summary findings from three sources of data. The chapter will extensively use the analysis of chapter seven to respond to the research question and ultimately lead to the conclusions and recommendations. It draws conclusions from the document survey on UB operations as well as the UB's leadership views with regards to resource allocation and commodification of knowledge. In keeping with the theme of "commodification" of knowledge and the university's contribution to the development of the economy it addresses key issues that have fundamental influence on the development of Botswana as a knowledge economy.

8.1 Overview

The research question sought to establish whether the resource allocations model in UB supports commodification of knowledge. The underpinning consideration for commodification of knowledge is that it comprises of processes, regulatory mechanisms and systems that ensure that quality, standards and exchange value are adhered to. First it became important to identify the enablers that were embedded in the UB system and how these would tend to influence resource allocation. To do this the study looked at the data resources at UB and established their inadequacy as well as their impact on management information needs. Secondly it was important to establish the level of awareness of the notion of commodification of knowledge. This was done through establishing the positions of faculties in areas of research, programme reviews and their pre and post graduate monitoring activities. Thirdly there was need to establish the existence of factors that demonstrated support for the commodification of knowledge and knowledge based economy notions by UB. The study considered the areas of teaching and learning, using institutional data (student/lecturer ratio, workloads etc.) and reflecting on ITS data (students completions rates, enrolment rates, success rates, failure rates, drop out rates etc.) to search for evidence that supports the notion of commodification of knowledge. In the area of research the study gathered evidence in the form of numbers of text books, journal articles and

inventions originating from UB which in themselves are products and creations of knowledge. Finally the study linked these to resource allocation through the input and output flows with a view to showing direct connectivity and influence of the resource allocations model to the process of commodification of knowledge.

8.2 National Perspectives - Botswana as a Knowledge Economy

Government and Higher Education (HE) institutions internationally face the challenge of defining and shaping their relationship with the citizenry. African universities are better equipped and endowed with befitting human resource to generate knowledge than other public institutions; it is expected that they fully participate in doing so. Universities that have to engage in the production of knowledge output in the form of research outcomes have to be ready to protect their outputs through patenting and copyrighting. They should also be able to resource their activities through closely inter linking with industry. State funded universities such as UB were established with social welfare roles to perform therefore recasting them to a capitalistic orientation would require developing a new mandate, funding and resource allocation models. For this reason achieving the following four critical areas has been identified as instrumental; (a) seeking a new balance in the government-university relationship; (b) coping with autonomy; (c) managing expansion while preserving equity, raising quality, and (d) controlling costs (Chapman & Austin, 2002). It is these items that describe the readiness and preparedness to embrace knowledge generation and sharing.

Rethinking the role of the state as sole provider as well as enabler and quality assurer of higher education is an issue that requires attention. Meanwhile, entry of new types of higher education institutions (such as private universities and universities from other countries) changes the tertiary education landscape. To this end the focus of this study has been on the Botswana tertiary education system with emphasis placed on university education and its role being that of creating the intellectual capacity to produce and utilize knowledge.

The study emphasises resource allocation models as central to financial efficiency and optimal usage of resources in the process of knowledge production in a state funded university. Granted that the notion of Education for the Knowledge Economy (EKE) aims to help developing

countries equip themselves with highly skilled and flexible human capital needed for such economies to compete effectively; this study focused on efforts being made by UB on the commodification of knowledge in areas of Business studies; lifelong learning; science, technology and innovation; Information and Communication Technologies (ICT).

At national level, policies and practices that make investments in human resource development more effective are being pursued through the national long term plan (Botswana Government, 1997) with TEC providing leadership in tertiary education. The process of innovation in university education can be realised through research outputs as well as production of well trained people. It is evident that several key indicators on pre-tertiary education have attained appropriate levels; these include the gender balance, the NER, the adult literacy rate and secondary enrolment. Unfortunately the transition rates have not been that good especially when considering the tertiary education enrolments against post secondary and university outputs. These directly impact on the quality and type of student that the UB has to work with.

It is however evident that Botswana is lagging behind when compared to South Africa and Mauritius in the areas of Human Development Index (2004), gross tertiary enrolments (2005), gross secondary enrolments (2005), computers, telephones and patent registration, although its performance in other areas is relatively good. It is with these in mind that this study explored university education developments in Botswana.

Botswana has seen a growth in its GDP and as a middle income economy it was found to be spending 8.5% of its GDP on education, which is the highest amongst all the middle income economies and higher than the world average. After comparing the size of the public expenditure on education to the knowledge indices produced by KAM it becomes imperative to evaluate the efficiency and effectiveness of inputs.

It is however evident that while spending on education as a proportion of GDP is on the high side by world standards, with government spending on average 8.5% compared to 4.5% spent by the rest of the world, the tertiary education share of government spending on education has continued to increase to 14% in 2005. The UB and colleges of education have received a declining percentage of the recurrent expenditure of the tertiary education budget which has been

accompanied by an average 1.6% increase in development expenditure during the 1996/7 to 2004/5 period.

8.3 The University of Botswana as a Key Player in HE

The UB's mission is "To advance the intellectual and human resource capacity of the nation and the international community". UB therefore plays a pivotal role of providing necessary manpower and human resource development that drives both the government or public and the private sector machinery. Because several colleges are affiliated to it, UB commands influence over a large part of the tertiary education population. This makes UB the number one priority of the state where higher education is concerned especially because it is funded by the state.

University education seems to be getting a generous share of the public expenditure on education and its output is expected to also have direct impact on the labour force market. Evidence indicates that 67% (in 2006) of UB's total budget goes to staff costs making it very important to assess the human resource efficiency. The evidence on outputs generated by the human resource was found to suggest some degree of inefficiency because the staff workloads (teaching and research) were not clearly known. The transition, completion and success rates were also not known.

The roll out of graduates recorded was cause for concern as they were not all absorbed by the market. The post graduate degrees especially the PhD candidates were disproportionately small in number compared to the number of professors and associate professors in UB.

It was further found that although only 2% of UB's total budget was allocated to research the coordination of research needed to be improved. Though research is a critical output in a university it did not seem to meet matching attention in its management. On the issue of relevance it was admitted that research generated significant outputs in the form of publications and information but these did not convert or translate into significant products or services in the economy.

8.4 Theoretical Reasoning

The challenges that come with the transition from Mode 1 to Mode 2 discussed by Gibbons (1998) continue to pressure universities. The quality and efficiency by which knowledge output is generated will stay with universities for sometime. It remains very important that recognition is given to the arguments advanced by critics of commodification that a balance should be reached so that commercialisation and commodifcation of knowledge do not overshadow the intellectual values of programmes. Programmes and research should be embraced for their intrinsic intellectual quality and should teach independent and creative thinking.

Given the evidence collected it would appear that UB takes on the type 2 entrepreneurship, which seeks to integrate science with society and sees production of knowledge and the ability to derive economic benefit from it as the appropriate route. Type 2 entrepreneurship justifies continued access to public funding but the research community must agree to surrender some of its autonomy and devote its resources to creating value for society first and value for science second (Jacob 2003). UB continues to be funded by government; it therefore has to create value for society. Even if UB wanted to take a different route (i.e. to take on type 1 entrepreneurship, where commodification of knowledge would have been structured to lead to financial self-sufficiency and act as a guarantor of future academic autonomy), the industrial sector of the economy is too small for the size of financial gains required. Moreover adopting the type 2 entrepreneurship presents UB with the opportunity to generate new knowledge and skills as well as transform the existing knowledge to benefit society.

The role of UB in educating people, developing theories, acting as partners in technological R&D, functioning as knowledge repositories and promoting knowledge sharing is clearly embedded in its priority areas. While there are strong economic reasons for science-industry links to be developed and nurtured it would seem UB, like other universities, has tended to support the business enterprise sector as an alternative way to patch cutbacks in governmental funding. The UB leadership has not taken kindly to the cutback and consider it as a disincentive because the revenues generated by the institution are subtracted from government funding.

The UB has to learn to adapt to new research, teaching and learning demands so as to continually track the processes of knowledge creation in the context of application. After designing its "Shaping Our Future" strategic plan with a mission and culture, strategy and structure, it should expect to see these being translated into the curricula offered, media used, research output, resource allocation, and external relationships developed. The aim is to develop a university which generates new knowledge and quickly decides when and how to make it commercially available or prevent it from commodification.[32]

Naidoo (2003) considered the perception that higher education is an industry for enhancing national competitiveness and is a lucrative service that can be sold in the global marketplace and Saint (2006) observes a growing international interest in ways of stimulating innovation as a source of competitive advantage. These observations point to the notion of competitive advantage as key to research agendas. Therefore developing economies through their institutions of higher learning- i.e. universities and professional institutions can create competitive advantage by using as well as developing indigenous knowledge. The institutional research agenda of state funded institutions should be geared towards indigenous knowledge. This way commodification of knowledge which is relevant and directly impacting on its society will be realised and exchanged for both economic and social benefits.

From the data collected the translation of the "Shaping Our Future" strategic plan is not supported by an effective resource allocation system to go with it, in which case the UB transformation process may not be fully realised without appropriate resource allocation mechanisms. In fact there has been an acknowledged waste of resources that has to be contained to ensure a successful future performance. The key policy formulation concept for UB is "excellence". In order to entrench it or translate it into measurable actions UB should be able to develop analytical capabilities in its graduates and demonstrate outstanding competencies in research work. The starting point should be the programme reviews and a research plan.

[32] Sociology of Science and Technology NETwork - last update: April 2006 accessed 14 Oct 2007.

8.5 Institutional Positioning

The evidence and findings gathered point to several things that need to be addressed. First there is need to identify the theory underpinning commodification of knowledge and relate it to UB activities. Secondly, to confirm if indeed the resource allocations model in UB is failing to facilitate commodification of knowledge and finally to consider actions to be recommended and ideas to be explored.

It is desirable that when the national funding council reveals its funding model UB should have prepared a way forward. However the financial and management of the input/output flow chart system suggested in Figure 7.2 is a skeletal framework that could potentially support effective resource allocation process. It could encourage institutional innovation capability as well as provide measures of control and monitoring processes which precede funding; this way the efficiency of the investments on education can be realised.

8.6 Commodification of knowledge as an engine of growth

One may interpret commodification of knowledge as the practice of creating wealth through knowledge products and exchanging knowledge for economic value, hence value in exchange. The ability and capability to efficiently generate and convert outputs of a university into an economically viable and exchangeable product can be referred to as commodification of knowledge. Therefore effective and efficient coordination and management of human resources, programmes and research activities would generate desired results in any university setting. This can be achieved through appropriate resource planning and execution of plans.

Commodification of knowledge requires applied knowledge that works to solve problems. Commodification of knowledge can be done by presentation of visible and or recognisable products that are exchangeable in the market, registered, copyrighted or attract funds from the external stakeholders. It is evident that research has contributed a lot of information at UB however the challenge is that of the need for it to be converted into knowledge products.

While recognising the contribution and rationale of needs assessment surveys as having been instrumental in the establishment of programmes, courses, and short courses at UB it has also to been noted that these might have contributed to the over- stretching of the UB resources. It is critical that UB continually conducts impact assessment studies, graduate appraisal and other market oriented studies and uses the findings to inform the UB of the new and emerging interests of the potential candidates.

The UB is using work plans at individual, departmental and faculty level; these have been driven by needs assessments expressed by departments or faculty. These have generated a varied range of courses and programmes which in turn put pressure on resources. The dilemma is that in a state funded university the economically driven interests generally struggle to outweigh social value and demands by the public. Perhaps this is because state funded universities have historically remained part of the social and political machinery as well as reform agents of the government of the day.

The initial scope and coverage of needs assessment of programmes that have been in use focused on the nation and its manpower requirements. Therefore with the revised UB vision, mission and aspiration that covers the region, Africa and the world, the new programme needs assessment must surely have to reflect this extended aspiration. The UB vision and mission has expanded the boundaries of the institution's activities but has this been accompanied by appropriately matched budgets and resources to go with the expansion? There is therefore the need for faculties to re-engineer themselves through programme/course reviews and human resource audits. These would in turn inform the human resource needs and requirements.

Although there is no open declaration to commodification of knowledge there are several indications and enablers pointing towards efforts to address it. The findings are that UB embraces the notion of the knowledge based economy through its mission statement of advancing the intellectual and human resource capacity of the nation and the international community. By identifying with the needs of an economy which aspires to be knowledge based, the UB subjects its activities to market oriented/directed/driven programmes and research activities. The mission statement of the UB was found to be placing the institution in a position

to measure up to the national intellectual needs. However the expansion of the UB's mission to include Africa and the World presents a much bigger challenge.

Evidence shows, however, that on matters of relevance there is need to involve industry and professional bodies. Although the faculty respondents indicated they have advisory boards it was still not clear if these do directly draw their strengths from professionals and industrialists. The findings are that there is evidence of several taskforces, committees and consultancies set up to review different operational activities of UB.

The commodification of knowledge concept has not been directly defined by UB but transformation is underway in many respects. The planning in UB reflects restructuring, redesigning and reforming activities intended to address quality, relevance and cost effectiveness. This has been confirmed by the DCB and the task forces appointed with varied terms of reference.

It was evident that only one dean out of those interviewed had internalised the notion of commodification of knowledge and acted on it because he had lined up contracts, agreements and arrangements to engage with specific external partners on specified projects. There was only one who made a distinction between research output and publications; as well as differentiated generation of information from knowledge output (products and services). Therefore commodification has been partially embraced in other quarters of the UB and needs to be well pronounced with a shared and common understanding.

8.7 The Key Priority Areas of Interest

The findings show that two goals that are gateways to supporting commodification of knowledge are engagement and entrepreneurship and increasing access and participation. Faculties claimed to be actively engaging with these goals. The evidence gathered shows that the perceptions of the different faculty deans interviewed differed and therefore in practice the implementation of plans may differ. For example the Faculty of Science has intentions to aggressively execute their plan of engaging with industry and get projects that generate revenue and new knowledge for

industry. The Faculty of Education places emphasis on interaction and engaging with stakeholders so they can address the education needs.

While the perceptions of the leadership at UB are similar to each other in many respects there is a significant information gap between senior management information requirements and the data base or resource, which makes implementation of plans difficult. The Faculty of Education however seems to have identified this weakness and is conducting staff workshops to discuss programme reviews and departmental plans. It is too early to judge the impact and influence that UB will have on the envisaged national innovation hub that is currently underway.

Relevance and quality of output are critical attributes for a competitive intellectual commodity. Therefore in commodifying knowledge not only is it necessary to make it relevant to the market but it has also to address market needs and shortages of skilled personnel. It should be noted that an institution stands out and becomes reputable if its knowledge output or commodity is competitive in the market. This would generally be reflected in programmes, courses and research.

Quality is measured in varied ways but the underlying principle is that of producing a product that yields the highest satisfaction to the user or consumer. Universities desire to achieve this goal cost effectively and therefore seek cost efficient ways to realise quality. It was therefore necessary to investigate the impact of the resource allocation system of UB on quality. It is also important to identify and evaluate those knowledge items, products and services that UB puts on offer to the community and the new knowledge outputs generated. To this end it is necessary to check on the practices and processes that address quality of programmes, courses (i.e. programme review) and research (policy, the patents, copyrights or registered rights).

8.8 The Increasing Access and Participation Goal

It is best to understand increasing access and participation as going beyond increasing numbers of participants because it includes expanding the variety of programmes, a variety of delivery approaches that include flexibility, diversity of delivery modes curriculum pathways as well as inreach and outreach strategies of institutions, continuing education and lifelong learning. Increasing participation is about creating opportunities for varied interest groups to be involved

in the learning. For example, in their responses no respondent identified a systematic process used to recognise prior learning and align it to entry requirements although there is a provision that other qualifications will be considered for entry into programmes. They do not seem to offer bridging courses for people who hold slightly lower than the required entry qualification, whereas an opportunity to upgrade entry requirements would have seen them participate in university education.

Evidence from the faculty of business indicates some level of involvement with the community through its business centre; for examples the KAM indication on the 8th grade achievements shows that there are yet more efforts to be made towards improving science and mathematics performance at pre-tertiary level. The D2 and D3 have acknowledged this fact and claim to have embarked on a project designed to identify and establish ways of improving the situation. Some other involvement with the community is found in the Centre for Strategic Studies (CSS); the Centre for Continuing Education (CCE)[33] and other UB centres. While this matter supports the notion of relevance and creation of an educated society the fragmented activities may be a costly endeavour if they go unchecked.

8.9 The Engagement and Entrepreneurship Goal

Engagement as a goal should be understood to refer to establishment of relationships of the university with stakeholders and the community. It draws its strength from collaboration with industry and civil society to strengthen academic excellence and performance as well as in the development of intellectual and human resource capacity. The entrepreneurship goal directly links the university's activities with that of the economy. It therefore serves as a direct linkage of the university's intellectual output to the economy. Through established platforms and integrated planning the university outputs can be linked to industry's requirements and opportunities availed for the institution to directly apply itself to the challenges facing the economy as well as generate revenue. This linkage would be best appreciated if a comparison of the economy's performance is put against the region and the world in general. To this end the KAM has been used as a diagnostic tool. The result have been discussed in 5.1 and 5.1.1 above.

[33] The CCE has commissioned a needs assessment study on Open an Distance Learning in Botswana hopefully this will inform the direction of increased access and participation

Within the internal structures of the UB there has been mention of advisory boards that seem to take on the role of advising the faculties but the extent to which these directly impact on the decisions taken was not clear. When probing the existence of intellectual outputs including activities that respond to the engagement and entrepreneurship goal it was evident that a good number of articles had been published but no patents had been registered. It was found that there is a lot of researched information published but not much has crystallised into patentable knowledge.

8.10 Programmes and Courses

Programmes and courses are intermediate input products that help produce skilled and competent graduate output to the market. For these programmes to attract students they should appeal to the students by demonstrating and signalling the marketability of skills and competencies they will acquire if they chose to purchase the products. Therefore the curriculum should be relevant and the quality of the content should be balanced to reflect the desires of the student and employer markets. Programme reviews are therefore an essential part of this exercise. Notably commodification of knowledge at another level therefore refers to the ability to load the curriculum with the relevant high quality content that appeals to the student and employer market, hence marketability of skills. Marketability is a reciprocal environment that changes over time and therefore requires regular checks with market trend setters.

Therefore the UB programme reviews, graduate performance appraisal and impact assessment studies should be made compulsory. Review of programmes and courses should be done without fear of losing jobs because members of staff whose programmes are discontinued may be redeployed to research an area that has been left behind. It is noted that the implementation of resolutions resulting from findings of the programme reviews is more likely to be avoided if it involves retrenching, redeploying or forced retirement of redundant staff. Such perceptions may render these reviews generally not effective. Programme reviews that generally carry significant impact in an institution would come from the highest office of the institution and should be conducted for the entire university. In some instances it would lead to retrenching staff if found redundant and in some instances it would lead to restructuring.

Another alternative is that of converting the existing programmes into attractive products that train individuals to command and deliver the desired output levels in their respective markets. To achieve this, a strong relationship should be developed between UB and industry at faculty level. Prioritisation and alignment of intra-faculty activities is an important practice that UB should closely watch. Professionalising programmes injects and increases the likelihood of market relevance of programmes and courses. Therefore reviewing programmes with a strong presence of leaders of industry and professional associations is necessary.

8.11 Resource Allocation

The above can be achieved if resources are made available and since these are not abundant, they have to be shared amongst competing priorities. A resource allocation model becomes central in ensuring appropriate and proportionate share allocation. For a resource allocation system to be effective, appropriate, and accurate data is a pre requisite. A formulaic resource allocation system has been recommended as the best because of its appropriateness in addressing effective/efficient use of resources. It, however, requires a reliable data base and support business process to go with it. Evidence gathered shows that the data source at UB is not robust and needs to be reconstructed or reconfigured to collect data that can meet the demands of planners. Along with this exercise there is need to develop a system that will upgrade data on a continuous basis. It is evident that this is not happening in UB, especially that the data source "Facts and Figures" is not regarded to be the best and the ITS output is yet to prove its potential once appropriate input is uploaded.

The analysis reveals that the current form of resource allocation does not support commodification as defined in the context of entrepreneurship type 1 or 2. If the staff/resource allocation model is not in place inefficiency will spiral out of control with devastating results.

8.12 Research

Evidence shows a number of publications are registered for Botswana by KAM records. Market and action oriented, or problem solving or solution driven as well as innovative research is what is required in industry. While there seems to be a UB policy on research it seems the plan to

engage the UB community is being rigorously pursued through departmental research plans. The linkage between staff workloads and staff research activity if captured in real time would assist in identifying those who need to be prompted to engage in research activities in time and thereby avoid punitive steps being taken at staff appraisal stages.

8.13 Recommendations

Based on the KAM scorecard outcome the challenges for UB can be outlined, as being to improve the research activities; enhance the entrepreneurship drive; engage rigorously with the pre-tertiary science and mathematics education, and improvement is required on professional and technical output into the labour force. There is documented evidence that UB has made efforts to address some of these aspects but there is a lot more to be done to translate these into actions that produce tangible and visible results. The programmes need to be adjusted to address the skills components most wanted by industry and the research needs to be market-led. The UB priority areas should be inclusive of scientific and technical knowledge and proportionate to business and social science but remain emphatically to service industry. The need for real time data to facilitate decision making should be emphasised because without it efficient resource allocation models are unlikely to work.

Management information is important and systems should urgently be put in place to capture and make it available in real time. Since programme reviews focus on content relevance and quality, there should also be a requirement for faculties/departments to conduct market surveys and impact assessment on their programmes after a specified period.

UB should be funded differently from the way it is at present as it faces global challenges that require it to react differently and promptly to change. The importance of real time decision making has become a matter of survival in higher education provision. UB can no longer afford to operate on stringent restrictions of rigid policies. If UB is to complement the current state funding system it may have to source funds from other regional groups/organisation and generate third stream income that is not tied to government control. It is necessary for UB to also have contingency funds for strategic purposes.

The funding formula allocation model has been found to be the best form of resource allocation system. Its strength is embedded on the fact that formulas may be varied to respond to the needs and requirements of the institution. The formulas can also be used as controls as well as provide direction on expected output. In doing so this allocation model allows for the institution to set appropriate parameters. The analysis presented in this study reveals that UB's model of resource allocation is not suitable to serve an institution that intends to serve a knowledge based economy. UB may have to design a resource allocation model with which it can work. A combination of block funding (or formulaic funding) and non-base funding (or earmarked funding) may be a starting point. This combination will afford UB flexibility and autonomy from block funding as well as enjoying the resources that are directed to address new goals.

A resource allocation model is urgently required for UB and a supporting database with real time business processes is important and should be put in place. UB should ensure inter-linkage and articulation of individual academics, departmental and faculty plans that converge towards the UB priority areas. This way UB will eliminate duplication of activities.

In addition to strengthening its research capability through improved relations with industry and the student body, ORD's plan to establish a commercialisation unit to facilitate registration of copy rights, patents and commodification of research outputs is long overdue and is a welcome development. UB should consider expanding the number of its graduate school PhD scholars in the field of engineering, science, technology and business. This way UB would increase its capacity to increase research output as well as increase its potential to attract global funding from international organisations.

UB should also consider strengthening its distance education and lifelong learning in new areas of business, science and technology. The increasing access and participation priority area can be best served by creatively taping on the potential of distance learning mode. Integrating this mode with the fulltime and part time would not only increase access and participation as perceived in UB but will lead to a new hybrid delivery mode.

8.14 Limitations of the study

While care was taken to ensure input from major stakeholders there were instances where officers were new in their office and as such not sure of historical issues of their office. Therefore institutional memory would have gaps in some instances. There were several of the sampled candidates that were not interviewed due to various reasons, including time constraints. Another key issue is that this study is dealing with contemporary issues and therefore affected by changes and passage of time.

The methodology fell short in that it gathered data from executive and senior management staff only. The study could be extended to cover middle management and academic staff and students so as get a broader opinion on the perceptions and views. Data obtained from these other sources would have required a different analytical process which would have included the SPSS where off several other tests would have been undertaken.

This study as a case study dealt with UB only but the study could be extended to cover universities of the Southern African Development Community (SADC). The significance of such a study is that it would cover the diverse practices and, political context as well as cut across university cultures that have not been covered in this study.

8.15 Future Research

A similar study can be conducted on a different population such as students and the lecturers to establish other views and perceptions of commodification of knowledge. It can also be conducted across the universities of SADC member states thereby different cultures and practices in differing context and environments.

8.15 Summary

The evidence from this study shows that UB's contribution is critical in the human resource development as a social commodity and in the production of knowledge as an economic product. This is particularly so because UB is the only national university at the moment. In the

international scene Botswana's areas of need have been identified through KAM diagnosis and in the local scene a Tertiary Education policy has been passed. Based on the KAM scorecard outcome the challenges for UB can be outlined, as being to improve research activities, enhance the entrepreneurship drive, engage rigorously on the pre-tertiary science and mathematics education as well as address improvement required on professional and technical output into the labour force.

The statistical data source at the UB has served as a very important data resource and is a useful skeletal guide and overview of UB operations. It gives us an opportunity to analyse and draw conclusions on key issues. However there are several things that make one question the reliability of some aspects of the data source in UB (Facts and Figures, 2003-2006). Some of these facts are issues relating to the way the data is collected and reported and the calculation of ratios and FTEs.

There is evidence, however, as shown in chapter five that shows that although there is data available at UB it has gaps. As such it does not meet the demands of a rigorous approach that would enable its consumers and users to make in-depth analyses for decision making. Since the resource allocation model requires input data that is collected and collated in a way that would efficiently address a scientific approach to resource distribution and allocation it is imperative for a real time database system to be in place.

The efficiency of a resource allocation model is embedded in the staff workloads whose performance is measured by using the FTE's, transition rates, completion and success rates as indicators. On the other hand the FTE's are key determinants of the system's efficiency level hence incorrect assumptions and inaccurate computations may result in serious errors of judgment and decisions leading to undesirable outcomes.

Although evidence from the UB leadership reflects that they are concerned with the lack of adequate management information it is also evident that the data resource is not well computed and has not been used in budgeting and allocating resources.

As already shown in chapter seven, if UB database is to impact positively on university education and knowledge production programme reviews, graduate appraisals and market needs

should inform the database of the institution. These should also be conducted on regular intervals of three or four years; this way the database is close to real time conditions and keeps the institution abreast with market changes.

There is need for the programme reviews to be conducted and most importantly recommendations should be discussed and shared with industry for its input before being implemented. A market survey on postgraduate programmes should be conducted for UB to inform its strategy on these programmes.

Our case revolves around the resource allocations model and how it supports and controls the operations of the university towards commodification of university outputs. Evidence shows that there is no staff workload formula and there is no resource allocation model. Further-more the data source is inadequate for purposes of efficient resource allocation.

The evidence gathered from chapter five to seven shows that UB has the necessary infrastructure and frameworks that support commodification of knowledge. However UB lacks the appropriate business processes and systems that complement them.

Competitiveness in an academic tertiary education environment is embedded in the competitiveness of intellectual/knowledge commodities. A knowledge commodity that commands economic value is one that is needed in the market and can be exchanged. Knowledge commodities come in the form of programmes which serve the student- market and; the graduates and research output that serves the industry. Knowledge producing institutions can therefore survive in these markets if their output is cost efficient and yields the highest satisfaction to the consumer (students or industry). Cost efficiency in this case would be realised through an appropriate resource allocation model that is supported by a workload system and an efficient data base.

UB faces stiff competition from new contemporary universities with more exotic and modern programmes to offer. UB should consider the emergence of the new institutions as providing a window of opportunity for it to reorganise itself without being over burdened by pressure to

increase its intake. UB may want to refocus its efforts towards efficiently utilising its assets and human resource especially by developing new products in the graduate school.

There is much inefficiency in UB, to which its poor database is a major contributing factor which is exacerbated by lack of clear business processes in certain critical areas. While there are plans at management level to turn the institution around there seems to be very little information reaching the different constituencies of the UB.

This study finds that it is compelling that UB develops a resource allocations model and a staff workload formula that guides the entire university operations. The biggest and most important resource to manage is the human resource because it accounts for 67% of the total budget of the institution. Because the budgeting system of UB has not been generously supportive of the research based knowledge production and generation much of its attention has been on the teaching outputs, there is need to change. The saturation of the market in certain disciplines forces the UB to down-size and redirect resources.

An increase in the research output; the commercialisation of output and strengthening of UB's relationship with industry are the first steps in the right direction. UB has to move away from the national incremental budget and look into the possibility of adopting the above recommended approach.

In the final analysis the UB does not seem to have a resource allocation model but has a budgeting system that does not support commodification of knowledge. Although principles underpinning commodification of knowledge can be traced in UB policies there is a need to strengthen systems, processes and quality control mechanisms to facilitate and support data collection and establishment of database. There is need for the establishment of inter-linkages (internal and external) to support the decision making processes at UB.

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Appendix A

UB's definitions of Expanding Access and Participation and Engagement and Entrepreneurship Priority Areas

Expanding Access and Participation

The University will respond to this priority as follows:

a . Undergraduate student enrolment. Develop and implement an undergraduate student enrolment plan, which strives to achieve a target 15,000 full-time student enrolments within the UB system by the conclusion of NDP9. The enrolment plan will focus on programmes of high demand and those of high national priority, and will seek to ensure gender equity in particular recognising the current low levels of female participation in the Faculty of Science and the Faculty of Engineering and Technology;

b. Implement a student enrolment management plan that will grow the numbers of students across all Faculties with a key objective to increase the proportion of students enrolled in Business and Information and Communications Technology (20%), maintain the current proportions in Science, Engineering, Technology, Health (27%) and Education (20%), and decrease the proportions of students enrolled in Humanities and Social Sciences (33%);

c . Life long learning. Increase opportunities for access to the University in particular for workforce development by expanding the number of part-time continuing education programmes at certificate, diploma, degree level and professional qualifications. Facilitate access to other tertiary institutions through the development of a foundation programme. Such provision will include distance programmes offered through self development, franchising, partnership arrangements with other universities, academic and professional institutions, and interactive video conferencing between Gaborone, Maun and Francistown and the global community, and access to ICT driven information resources through partnerships, cooperative ventures and contractual agreements. The CCE (Centre for Continuing Education) will be reconceptualised as a technology driven open and distance tertiary learning centre for the nation;

d . Branch Campuses. Prepare a comprehensive academic framework, academic programme, academic support, student enrolment plan and a supporting master, facilities and resource plan to develop branch campuses and seeking funding to implement.

e. International. Strengthen efforts to 'internationalise' the campus by continuing to target 10% of the student enrolment for international students with specific reference to the 'SADC Protocol on Education and Training'.

Engagement and Entrepreneurship The University will respond to this priority as follows:

a . **Engagement**. Establish a new position of Deputy Vice Chancellor (Research and Innovation) with policy responsibility for and general oversight of UB's research activities, graduate education, intellectual property, commercialisation of research and liaison with industry, UB Foundation and external funding bodies, stimulating development and entrepreneurial activities and diversification of the institutional funding base.

b. Establish an Institutional 'Stakeholder Advisory Group' comprising Individuals representing many areas of the community including, business, industry, education, NGOs and civil society organisations to promote partnerships and engaged research and service. Strengthen academic advisory boards to help them establish work placements, plan fund raising initiatives, provide service to the community, and advise on academic curricula;

c Establish local community learning hubs using technology to link local communities and the University and providing learning opportunities covering different areas of interest for various interest groups and to function as a community resource for innovative ideas;

d. **Entrepreneurship**. Develop and implement a plan for innovation and entrepreneurship that inter alia, will:

- Establish the University as the nation's central hub for innovation in the areas of scientific, technological, social and economic advancement, and Botswana's social and cultural heritage and artistic creative and cultural activities;
- Motivate the academic core of the University to adopt an entrepreneurial approach, attitude and mentality to their work and to willingly seek opportunity and income for the University;
- Build a diversified funding base for the University, in order to shift from an almost exclusive reliance on Government bulk funding towards a greater reliance on new income streams obtained from research, consultancies, contract education, collaboration with business and campus activities;
- Extend the outreach of the University to embrace an extensive array of national, regional and international partnerships, patrons, relationships, and collaborations that will be of mutual benefit and in addition will enhance the reputation and finances of the University.

Appendix B

Semi Structured Questions asked to Survey Respondents

Would you say that your strategic plan aligns and facilitates your faculty's participation on the following UB goals?

- Engagement and entrepreneurship? And
- Increasing access and participation and how so?

How is your faculty planning to make its outputs become viable for a knowledge economy?

Has there been an audit of the programmes and courses offered by your departments?
Which programmes or courses have been removed or suspended to give way for new ones?
Has there been an audit of the human resource?
Which HR areas need to be increased or down sized in your departments?

Do the figures in the UB's fact book reflect the staff on ground for fulltime, fulltime temporary, part time lecturers and teaching assistants engaged in your faculty?
Do the staff/student ratios in UB fact book data reflect the situation on the ground?
On average how many staff members resign or do not renew contracts?
What do they cite as the main reason for their decision?

On average how many articles get published by your departments in a year?
How many researches are undertaken by your departments in a year?
Have any of the outcomes been patented or registered?
Would you say students in your faculty/centre have participated in researches?

Would you say the resource allocation model in the UB is adequately addressing you requirements?
What should drive the resource allocation model of UB?
Where do you think inefficiency is in the model?
What are the strengths of the UB allocations model?
What have been the weaknesses of the UB allocations model?
What would you want improved in the UB allocations model and why?

Appendix C

Source: University of Botswana Facts and figures 2003-2006

Student Enrolment by Faculty/School

Academic year	2002/2003	2003/2004	2004/2005	2005/2006
Business	923	635	1417	1535
Continuing Education	1533	1728	2245	2265
Education	2295	2687	2914	2738
Engineering & Technology	1290	1577	1366	1298
Graduate Studies	700	769	779	933
Humanities	2688	3265	3168	3091
Science	1305	1469	1396	1494
Social Sciences	2049	2524	2440	2356
Total	12783	15425	15725	15710

Student Enrolment by Faculty/School as a Percentage of the Total Annual Enrolment

Academic year	2002/2003	2003/2004	2004/2005	2005/2006
Business	7.22	4.12	9.01	9.77
Continuing Education	11.99	11.20	14.28	14.42
Education	17.95	17.42	18.53	17.43
Engineering & Technology	10.09	10.22	8.69	8.26
Graduate Studies	5.48	4.99	4.95	5.94
Humanities	21.03	21.17	20.15	19.68
Science	10.21	9.52	8.88	9.51
Social Sciences	16.03	16.36	15.52	15.00

Academic Faculty in Post

Academic year	2002/2003	2003/2004	2004/2005	2005/2006
Professor	39	38	33	32
Associate professor	58	46	54	58
Senior lecturer	148	147	160	178
Lecturer	523	529	544	559
Staff Development Fellow	57	16	-	42
Total	825	776	791	869

Support and Industrial Staff in Post

Academic year	2002/2003	2003/2004	2004/2005	2005/2006
Executive Management	4	4	4	4
Senior Management	33	36	42	45
Management	120	136	144	154
Support & Industrial class	1169	1220	1193	1187

Faculty Academic Staff Establishment (FTE)

Faculty/Academic year	2002/2003	2003/2004	2004/2005	2005/2006	Staff/Student Ratio
Business	40	41	43	43	1:48
Continuing Education	-	-	-		-
Education	146	154	158	159	1:26
Engineering & Technology	70	74	86	88	1:15
Graduate Studies	-	-	-		-
Humanities	99	102	106	109	1:36
Science	166	176	179	183	1:25
Social Sciences	121	127	133	137	1:39
Total					

University of Botswana Revenue & Govt. Subvention Statement 2002/03-2005/06				
Financial Year	**2002/03**	**2003/04**	**2004/05**	**2005/06**
Revenue	82,201,000	91,482,000	104,201,000	117,615,000
Govt- Subvention	273,529,000	368,736,000	337,400,080	344,475,110
Total	355,730,000	460,218,000	441,601,080	462,090,110
University of Botswana Analysis of Costs Statement 2002/03-2005/06				
Financial Year	**2002/03**	**2003/04**	**2004/05**	**2005/06**
Staff Costs	240,206,713	288,985,075	311,706,853	359,338,499
Other Operating Costs	155,779,790	171,233,546	189,109,267	174,215,826
Total Expenditure	395,986,503	460,218,621	500,816,120	533,554,325

KAM Scorecard

Variable	Botswana (Group: Upper Middle Income)	
	actual	normalized
Annual GDP Growth (%), 2002-2006	5.24	5.56
Human Development Index, 2005	0.65	0.38
Tariff & Nontariff Barriers, 2008	67.6	1.2
Regulatory Quality, 2006	0.48	5.56
Rule of Law, 2006	0.63	8.15
Total Royalty Payments and receipts(US$/pop.) 2006	7.25	3.2
Scientific and Technical Journal Articles / Mil. People, 2005	29.39	2.96
Patents Granted by USPTO / Mil. People, avg 2002-2006	0	1.11
Adult Literacy Rate (% age 15 and above), 2005	81.2	0.53
Average Years of Schooling, 2000	6.28	3.5
Gross Secondary Enrollment, 2006	74.94	1.92
Gross Tertiary Enrollment, 2006	5.12	0.4
Life Expectancy at Birth, 2005	35	0.37
Internet Access in Schools (1-7), 2007	2.8	0.4
Public Spending on Education as % of GDP, 2006	10.7	10
Prof. and Tech. Workers as % of Labor Force, 2004	12.16	1.74
8th Grade Achievement in Mathematics, 2003	366	1.43
8th Grade Achievement in Science, 2003	365	1.43
Quality of Science and Math Education (1-7), 2007	3.8	3.6
Extent of Staff Training (1-7), 2007	3.8	5.2
Quality of Management Schools (1-7), 2007	3.4	0.4
Brain Drain (1-7), 2007	3.5	6.8
Total Telephones per 1,000 People, 2005	541.1	0.74
Computers per 1,000 People, 2005	45.2	0.38
Internet Users per 1000 People, 2005	34	0.74

Variable	Botswana (Group: All)	
	actual	normalized
Annual GDP Growth (%), 2002-2006	5.24	6.04
Human Development Index, 2005	0.65	2.68
Tariff & Nontariff Barriers, 2008	67.6	2.37
Regulatory Quality, 2006	0.48	6.5
Rule of Law, 2006	0.63	7.14
Total Royalty Payments and receipts(US$/pop.) 2006	7.25	5.23
Scientific and Technical Journal Articles / Mil. People, 2005	29.39	5.4
Patents Granted by USPTO / Mil. People, avg 2002-2006	0	2.36
Adult Literacy Rate (% age 15 and above), 2005	81.2	2.8
Average Years of Schooling, 2000	6.28	4.9
Gross Secondary Enrollment, 2006	74.94	3.76
Gross Tertiary Enrollment, 2006	5.12	1.59
Life Expectancy at Birth, 2005	35	0.07
Internet Access in Schools (1-7), 2007	2.8	2.82
Public Spending on Education as % of GDP, 2006	10.7	9.91
Prof. and Tech. Workers as % of Labor Force, 2004	12.16	1.6
8th Grade Achievement in Mathematics, 2003	366	0.82
8th Grade Achievement in Science, 2003	365	0.61
Quality of Science and Math Education (1-7), 2007	3.8	3.79
Extent of Staff Training (1-7), 2007	3.8	5.48
Quality of Management Schools (1-7), 2007	3.4	2.1
Brain Drain (1-7), 2007	3.5	5.97
Total Telephones per 1,000 People, 2005	541.1	4.79
Computers per 1,000 People, 2005	45.2	4.02
Internet Users per 1000 People, 2005	34	2.36